THE ENGINEERING AND MINING JOURNAL.

RICHARD P. ROTHWELL, C. E., M. E.
ROSSITER W. RAYMOND, Ph. D. } Editors.

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

THE February meeting of the Institute will be held in New York City, beginning Tuesday evening, February 27. The place of meeting will be subsequently announced. Members will please give early notice to the Secretary of their intention to read papers at this meeting

THE fourth volume of "Transactions of the Institute" has been mailed to all members and associates not in arrears for the current year. Prompt notice is requested by the Secretary in case any member has failed to receive his copy. The bound volume will be ready for distribution in about a week.

LAFAYETTE COLLEGE, EASTON, Pa. THOMAS M. DROWN, Secretary.

"THE ENGINEERING AND MINING JOURNAL" ADVOCATES THE ADOPTION OF THE METRIC SYSTEM OF WEIGHTS AND MEASURES,

and urges all who are interested in the simplification of our present complicated and unsatisfactory systems to aid, by their active sympathy and encouragement, the early introduction of this much-needed reform.

NEW PUBLICATIONS.

AN OUTLINE HISTORY OF JAPANESE EDUCATION. Prepared for the Philadelphia International Exhibition by the Japanese Department of Education. New York: D. APPLETON & Co., 1876.

SECOND ANNUAL REPORT OF THE MINISTER OF EDUCATION FOR THE SEVENTH YEAR OF MEIDÉ (1874).

The intelligence and energy with which Japan has advanced during the last 15 years to a place among civilized nations, invest with peculiar interest the records of the past history, as well as the present progress of that empire. Perhaps the tendency of most people in this country has been to overrate the achievements of recent Japanese administrations; while as to the Japanese literature and education of past times, there is general ignorance and uncertainty. The first of the publications above mentioned throws a flood of welcome light on both subjects. The introductory chapter was prepared by Dr. DAVID MURRAY, Foreign Superintendent of Education in Japan. The remaining chapters, giving a complete review of the educational history and condition of the country, are the work of Japanese writers, even to the English translation—which has, however, in nearly every case been revised by the well known scholar, REV. DR. G. F. VERBECK. The book contains an account of the present Japanese educational system, including the elementary, normal, "foreign language" and professional and technical schools, the University of Tokio, books and newspapers, libraries and museums. There are also a review of ancient and modern Japanese history and literature, and descriptions of the Japanese language and learning, arts and sciences, the whole constituting a compact manual of information. In the quaintness and *naiveté* with which in many instances this information is imparted, lies an additional attraction. For instance, SAKAKIBARA YOSINO, compiler of Chapter V, after remarking that the Japanese "syllabary," or table of fifty syllabic sounds, systematically arranged, is said by recent writers to have been invented by ancient sages or kings, adds that this is a forced inference, drawn from the fact that it is now extensively used; and then gives his own opinion that this nicely-harmonized system "appears to be of divine origin"—which we suppose he does not consider "a forced inference." Yet, while we smile at such logic, we may well reflect that it is not without parallel in our own literature.

The statistics given in both these reports are those of 1874, but Dr. MURRAY says that the rate of increase was still greater in 1875 than in any previous year, and estimates that in 1875 the number of schools was at least 30,000, and of pupils 2,000,000. In 1874 there were 18,712 elementary schools, with 1,725,107 pupils, an increase of 10,714 schools and 397,155 pupils upon the preceding year. The income of the schools from fees, taxes, funds, Government appropriations and miscellaneous sources (including the large item of more than a million *yen* from voluntary contributions) was 3,794,123 *yen* or U S. dollars), or twice as great as in the preceding year; while the value of the school property had increased from not quite three to nearly five and three-quarters million dollars. The number of private schools had decreased from 2,356 to 2,224—which we take to be a significant testimony to the superiority of the public system. We regret that we have not space enough to quote at length the statistics and descriptions of the normal and higher schools. Our readers can gather from the the papers of Prof. MONROE before the Institute many hints on this subject; and indeed those papers (particularly that on the proposed plan of a mining school) and the documents here under consideration constitute admirable commentaries on each other. When we remember that Japan is poor, both in accumulated wealth and in natural resources, the extraordinary energy developed of late years by the Japanese Government in its efforts to get abreast of modern civilization seem all the more worthy of praise and encouragement. It may be true, as many observers assert, that the Chinese are superior to the Japanese in the capacity for real progress; but in view of the most recent history of both nations, we incline to the belief that the point is yet undecided, though most of the advantages in the competition, aside from national character, are with the larger and richer empire. *

KNIGHT'S AMERICAN MECHANICAL DICTIONARY is now complete, the third volume having been issued by Messrs. HURD and HOUGHTON, the new publishers of the work. We have already placed on record our favorable opinion of this book, which reflects equal credit upon the industry and skill of the author, and the enterprise and taste of the publishers. Messrs. HURD and HOUGHTON have carried through without lowering its standard of excellence the liberal plan projected by J. B. FORD & Co., the first publishers, and the mechanical execution and abundant illustrations of the Dictionary are unsurpassed, if not unequalled, among books of its class. The final volume, like its predecessors, exhibits Mr. KNIGHT'S peculiar talent in classification. An excellent example of this will be found under the article "Sewing-Machine," which gives the most full, comprehensive and intelligent account of the development and present modification of this invention with which we are acquainted. Turning a leaf or two, we come to "Shoe-Making Machinery," and find under this head a list of 126 machines, which are separately described. But this is as nothing compared with the elaborate account of all varieties and parts of the steam-engine given under that head

In passing a critical opinion upon the work as a whole, we must frankly admit at the outset that it fills a place which no other book yet published can pretend to occupy. It is not a cyclopædia, though it contains a vast amount of curious and useful information; it is not a text-book of mechanics, though it incidentally explains many mechanical problems, and explodes mechanical fallacies; it is a dictionary, explaining the nature and uses of machines and parts of machines, so that the engineer, inventor or student may be guided in his inquiries or relieved from his perplexities. In addition to this fundamental feature, the book contains, with respect to many important applications, a succinct history of inventions related to them. This will doubtless be useful in a negative way to inventors, who may often be enabled to avoid unnecessary expense by finding that their ideas have been anticipated. On the other hand, the expert in any branch of mechanical engineering will perhaps be annoyed by this feature, finding many devices described and even honored with illustrations which have never been put into successful practice, while some of the most ordinary and popular forms are not figured at all. This is the result, no doubt, of the fact that the records of the Patent Office (on which Mr. KNIGHT has naturally relied to a great extent) do not contain descriptions of machines not patented; and while he has shown great industry in searching for these, he has not always found them out, or secured drawings of them. But it is not safe for any complaining critic to assert the absence of any important item before he has thoroughly hunted for it with the aid of Mr. KNIGHT'S invaluable classified indexes.

Mr. KNIGHT is evidently possessed of antiquarian and literary tastes in a high degree; and he has indulged them in this work in a manner which imparts to its pages unusual life, and produces occasionally an agreeable surprise. If he can go back to PLINY, PANSANIAS or MANETHO, in tracing the history of any art, he is sure to do it; and if an apt quotation, even of poetry, occurs to his mind, he is quite likely to yield to the temptation of inserting it. Many of his compact paragraphs might be expanded into very readable magazine articles. Take, for example, the remarkable treatise under the title "Pen," a capital review of the general subject of written language, accompanied with a great number of illustrations, the largest of which presents a passage of Scripture in 103 different languages. Bits of curious research like this, scattered through the work, serve a purpose of entertainment and instruction which, though subordinate to the main uses of a dictionary, is scarcely less important in its way, and will certainly help the sale of the book. *

KATECHISMUS DER GRUBENERHALTUNG.—An excellent manual (by Mine-director W. JICINSKY of the Bohemian town of Maehr-Ostrau) is published by the Miners' and Metallurgists' Union of that place under the title *Katechismus der Grubenerhaltung*, and treats, in well-constructed questions and answers, of the topics of timbering, masonry, iron supports, and in general the preservation of underground works. The style is clear, and frequent wood-cuts explain all doubtful or difficult points. We wish there was as good a simple manual of the kind in English. Since there is none, so far as we know, we advise young en-

gineers who are acquainted with German to buy this one, unless they already possess the larger text-books in the same language on this subject. This book can be had of G. STECHERT, 2 Bond Street, New York. *

THE KINEMATICS OF MACHINERY. OUTLINES OF A THEORY OF MACHINES. By F. REULEAUX. Translated and Edited by ALEX. B.W. KENNEDY, C. E. London : MACMILLAN & Co., 1876. 8vo. pp. xvi., 622. $7.50.

The subject treated by the author in this, one of the most remarkable works on machinery that has ever appeared, has engaged the attention of eminent writers for many years, but probably few will read the present work without being convinced that Prof. REULEAUX's treatment marks a new era in the discussion of the problem. It is reasonable to believe, also, that though the views given in this treatise may not be immediately accepted by conservative schoolmen, they will eventually form the basis of a more enlightened instruction in the science of mechanism. The work under consideration is so elaborate, and the ground covered so extensive, that nothing but a superficial review can be attempted in the present notice, in the hope that the interest of the reader will be sufficiently aroused to induce him to peruse the book itself.

Kinematics, "the science of pure mechanism," as defined by the author, is "the study of those arrangements of the machine by which the mutual motions of its parts, considered as changes of position, are determined." In treating of this subject, it is obviously important to get a clear idea of what is meant by a machine, and a long list of so-called definitions by eminent writers shows one very marked reason for the hitherto defective analysis of the problem. Prof. REULEAUX's definition is as follows : "A machine is a combination of resistant bodies so arranged that by their means the mechanical forces of nature can be compelled to do work accompanied by certain determinate motions."

If new, general principles can be established by which the relative motions of any given bodies can be determined and methods can be found for producing any required motion, the inventor and designer are furnished with a powerful lever to aid them in their labors. It is especially to the inventor that the author addresses himself. Admitting that so much of invention is due to genius that without it mere science will not be of much avail, he claims that a scientific method of investigation will greatly increase the power of the inventor, precisely as a knowledge of the higher mathematics aids the analytical student. With this end in view, the author has devised a notation by which he can obtain expressions for mechanisms made up of given elements ; and by analysing these expressions in a manner analogous to that in which algebraic equations are discussed, can determine the various combinations into which any given set of elements can be formed. This kinematic notation is so novel, and at the same time so simple, that a brief account of it may properly be given. In order to render the analytical expression of a mechanism complete, it must be made up of symbols which show

1st. What classes of elements are employed. (Class symbols.)

2d. Whether the elements employed are hollow or solid, plane or curved. (Form symbols.)

3d. How the elements are connected, and the mechanism fixed. (Symbols of Relation.)

The class symbols are only twelve in number, viz. :

S. Screw.	G. Sphere.
R. Solid of revolution.	A. Sector.
P. Prism.	Z. Tooth or projection.
C. Cylinder.	V. Vessel or chamber.
K. Cone.	T. Tension organ.
H. Hyperboloid.	Q. Pressure organ.

Simple signs in connection with these letters show whether the elements are solid or hollow, with plane or curved profiles, and the symbols of relation are lines, dots, and algebraic signs. Various forms of abbreviation are also indicated, so that the final formula for a mechanism becomes at once concise and expressive.

After a thorough explanation of these symbols, and the methods of combining them, their application to kinematic analysis is shown, producing results that will doubtless be surprising to the majority of inventors and mechanicians. It would be impossible to follow this investigation very far without the aid of the profuse illustrations given in the work, but some few points may be indicated. Few persons would see much resemblance between the ordinary rotary engine and a direct-acting one, and it has been reserved to the kinematic analysis to disclose the kinematic identity in numerous instances. The nature of the analysis is to assume any element of the arrangement making up a direct-acting engine to be fixed at pleasure, and any part as piston, when a variety of mechanisms in actual practice will be the result. A similar analysis for pumps and blowers discloses many interesting features, and it is worthy of note that Prof. REULEAUX's method of investigation furnishes what is probably the most satisfactory explanation of the disc engine that has ever been given. In fact it is not unreasonable to believe that the method, when fully investigated, will do as much service in problems of pure mechanism as the analytical treatment renders in mathematical and mechanical science. This, indeed, is what the author asserts, and he has gone far to make his position good. Few will deny the advantage of this generalization of the subject. The author does not claim that his method is one that can be easily learned and applied; but, as far as he has gone, he has covered the ground so thoroughly that any one need only study the work closely in order to comprehend the method. Even the casual reader can scarcely fail to derive much benefit from a perusal of this work, while, at the same time, he will certainly be greatly interested.

In this brief notice, only a few of the more prominent points have been touched upon, much that is novel being left for the reader to discover. It only remains to add that the appearance of the book is very creditable to the publishers, so that those who like to see a worthy work worthily presented, in clear type, on good paper, and with finely executed illustrations, will hardly fail to be satisfied in the present instance. B.

THE SILVER ISLET VEIN, LAKE SUPERIOR.

By Walter McDermott, Late Assayer, Silver Islet Mining Company.

From the private manner in which this property has been owned and worked, very few details of the mine have been made public ; although the vein, as developed, is in many respects remarkable, and the conditions of occurrence of the silver are well worthy of attention. In the following paper it is proposed to give an account of some of the most striking features of the vein, with a comparison of the conditions determining the deposit of the silver with those in mines of other countries.

The position of the Silver Islet vein, on a small bare rock 70×80 feet, three-quarters of a mile from shore and exposed to the full sweep of Lake Superior, has controlled the extent of the workings. It is not proposed here to describe the difficulties to be overcome in order to work a vein actually under water at its outcrop, on a bare rock over which the waves of Lake Superior freely washed in every storm. Suffice it to say, that at a great cost the matter was accomplished, an artificial island built up of cribs and thousands of tons of rock, a water-tight cofler dam sunk, and a shaft and customary workings opened. This opening of the lode by a single shaft has limited the workings, so that although the mine has been in active operation some six years, the present depth is only about 650 feet, with a maximum extension of about 500 feet. From this small excavation, but really confined to a mere portion of it to be subsequently described, about $2,500,000 in silver have been taken ; and there is no reason why as much more may not be hereafter extracted.

The immediate country rock around Silver Islet consists of a very siliceous slate, with a slight dip to the east. Through this slate a number of diorite dykes cut, running in a general north-easterly direction. These dykes, withstanding better than the slates the action of the air and water, are left standing in places as small islets or as a backbone to larger islands, in the vicinity of Silver Islet, which is itself one of the small crags of diorite left above water. When work was first commenced on the rock, the white, clearly marked vein could be distinctly seen under a few inches of water, cutting at right angles across the dark body of the diorite dyke, and thus having a north-west strike. In the mass of the dyke a strong branch vein east of the main lode, and diverging to the east, could be also seen ; and south of the junction of these two, a strong spur shot from the vein diverging to the west. In addition to these two, a number of smaller strings or leaders could be seen leaving the body of vein matter, but falling into it again at a greater or less distance. About 20 feet to the south of the junction of the east and main veins, the diorite was found to be strongly impregnated with graphite, giving a black, coarsely granular, friable character to the whole rock so changed. The walls of the vein when cutting this rock were smooth and well defined, often exhibiting beautifully polished grooved surfaces, perfectly black and soiling the fingers when touched; occasionally small nodules of pretty pure plumbago occurred in the walls, some of these weighing several pounds. The zone of this graphite impregnation extended south in the dyke for a length of about 100 feet, with an average width of about 40 feet,—occupying the entire space between the east and the main lodes at this point, and extending in places a few feet feet outside of both. The general form of the zone was an irregular pear shape, with the small end north, in correspondence with the approach of the two veins to each other. The mass of gangue itself consists of an irregular mixture of white and salmon colored crystalline calcspar, carrying also carbonate of magnesia ; and, in the colored portions at least, quite a proportion of manganese, probably as rhodochrosite ; indeed, distinct crystals of that mineral have been observed. With the calcspar, irregularly distributed, are patches of quartz and scattered crystals. As in most vein gangues, the character varies, being in places highly crystalline, and at other points finely granular ; while the proportion and depth of color of the pink spar, and the distribution of the quartz, add to local differences, and after experience become accepted as indications either favorable or otherwise to the occurrence of silver. The width of the vein varies, but will average from 5 to 6 feet, though at one point increasing to 25 feet, and at another pinching almost out. At certain parts of the lode "vuggs" are frequently met with, usually lined with crystals of calcspar, quartz, and often containing clay, with varying quantities of iron pyrites, galena, zinc blende, and argentite. The silver occurs mostly native, in grains, threads, or massive, rarely crystallized ; also as sulphide of silver massive, or in leaves and well formed crystals. Associated with the silver are found iron and copper pyrites, galena, zinc blende, niccolite, smaltine, and occasionally stephanite and pyrargyrite have been observed. The form of distribution of the silver is in patches and streaks from an inch up to 2 feet in width, and from a few inches in length up to 20 or 30 feet. These masses occur either irregularly scattered, or arranged in broken lines for a distance of 50 or 60 feet. Many of the pockets consisted of almost massive silver, with so little intermixed rock that the mass flattened under the hammer, and would remain shattered but firmly clinging after a blast.

The fact most striking to one who examines the parts of the vein from which the most valuable ore has been extracted is the evident connection of the deposit of the silver with the region of graphite impregnation of the wall rock, and this point will be readily conceded on the following facts :

The east vein was found in sinking to drop towards the main lode, and at about 300 feet in depth a junction occurred. The plumbago was found to decrease in width as the veins neared each other, and at length, at about 360 feet, it suddenly cut out on a floor ; and when the graphite ceased the silver was found no more. The east vein itself received the benefit of the graphite, and yielded much rich ore, until it fell into the main vein. When branches or small strings of the vein occurred in the plumbaginous rock, silver was generally found in them, often as a sort of thin plate between the spar and the graphite walls, and outside of the veins the graphite rock itself frequently carried silver. The west vein, lying under the foot-wall of the main vein, joins the latter as already stated, the plane of intersection dipping off more and more to the south as depth is attained, at the 420-feet level the two veins running parallel for over 100 feet. It has been in the vicinity of the junction of these

two veins, and within the body of the plumbago ground, that the immensely rich bunches of silver have apparently congregated in the upper levels. The dyke itself dips to the south, and the run of silver dipping in the same direction has always remained within the diorite rock. North and south of the dyke, in the slate, the vein has so far proved itself incapable of carrying silver. A few scattered small patches of silver have been met with, but the quantity has been so small and the occurrence so seldom, that practically all past experience would pronounce the slate as unproductive. The same term indeed might almost equally well be applied to those parts of the diorite which do not contain graphite ; but the graphite has not been found in the slate at all. The west vein in the upper levels yielded very rich ore while running in plumbaginous rock, but on being followed out into clean diorite ceased suddenly to produce. The vein is not devoid of metallic minerals either in the slate or in the normal diorite. Galena and zinc blende are found plentifully scattered, but neither of these minerals carry more than form a mere trace up to 2 or 3 oz. of silver to the ton when found outside of the plumbago ground. Within the silver-bearing portions of the vein both the lead and zinc blende are usually rich in silver, in some cases the latter metal appearing to be contained within the ore as small disseminated grains of native silver, while in other instances the silver appears to be in regular combination as isomorphous sulphide. This rule, however, is not by any means universal, for occasionally patches of galena or zinc blende are found in close proximity to rich bunches of silver, and yet are almost devoid of the metal themselves. The other fact, viz., that outside of the plumbago ground the galena and zinc blende are practically without silver, has so far been without exception.

The observation of the well-defined limits of the graphite within the diorite naturally led to the supposition that the mass being in the form of a detached deposit, further pockets within the dyke might be fairly expected in sinking. The occurrence of graphite in Cumberland as large pockets within the trap rock lends additional force to this belief. The expectation has in a small degree been already realized. At a depth of nearly 200 feet below the upper mass a small isolated patch of plumbaginous diorite was found, and about 60 feet again below this a third pocket was met with. Neither of these last two was of any great size, the lower and larger being only about 9 feet in length, but it is a remarkable fact that in both cases some small streaks of silver were met with, although in the ground between and above no trace of native silver had been observed.

While treating on the subject of the graphite, another occurrence apparently connected therewith may here be appropriately mentioned. At a depth of about 360 feet it was found that many of the "vuggs" were filled with an inflammable gas. This gas, either opened upon in volume by the exposure of a large cavity, or issuing under pressure from a fissure in company frequently with water, was found to burn freely, and from its negative qualities and the color of its flame, was set down as carbonic oxide. In some cases, especially in the lower levels, the volume of gas contained under pressure was really startling, and jets of flame many feet in length were maintained for hours at a time. In one case a flame was thrown forty feet along the top of a level from the sudden breaking into and ignition of one of these pent-up reservoirs. Some men were seriously burnt in this instance, and after the flame had somewhat subsided, it became possible to creep along the floor of the level and plug up the drill hole from which the jet was issuing in such manner as to leave only a small flame burning. This regulated jet burned steadily for about six weeks before the supply of gas was exhausted. The origin of the gas has been attributed in some way to the carbon of the graphite ground, and is accepted as a further indication of the probability of large masses of plumbago below the present workings. Whether the gas is at present forming, or has remained pent up for ages within the cavities of the rock, cannot be stated with the present knowledge of its occurrence. The only fact bearing on the question of origin so far observed is that at the part of the vein where the gas was first seen, an evident decomposition of the vein matter was taking place, the rock being honeycombed, softened and generally changed in character, the change having been accompanied by a deposit of well-formed crystals of silver glance, galena and zinc blende. This, however, was only being observed at one or two points in the vein, and may merely indicate the present formation of geodes within the veins, without connection with the origin of the gas found filling these cavities. The water percolating through the fissures of the vein appears to be clear, pure and free of acid elements, as indeed might be expected in passing through a calcareous gangue. No analysis has, however, been made of the water. In boring with the diamond drill at a depth of 300 feet below the lowest working, gas and water were met with again.

In recapitulation of the conditions under which the precipitation of the silver seems to have taken place, it will be observed that the determination of the deposit is in accordance with most of the conditions accepted as generally favorable in other mining districts. In some respects every mining region is a law only unto itself, but there are certain generally accepted principles that apply with more or less force to all. It would be extremely foolish for a person to go from one mining country into another and apply a local experience in the first strictly to the second without regard to actual observation in the latter. An engineer of experience will always in the first place discover all he can of the actually observed, and if he can then make these facts chime in harmoniously with any theory of his own, he will feel confidence in directing his explorations accordingly. If there be a want of harmony between facts and theory, the practical man bases his operations on the former, and keeps the latter to himself until circumstances are more favorable.

LAKE COUNTY, COLORADO.

A "SMELTER" WANTED.

TO THE EDITOR : SIR—Some time since I noticed a very true and interesting account in your paper of the working of the placer mines in California Gulch, near the old town of Oro. I was there in the spring of 1862, when the gold fever was ebbing, though it was lively even then, and money was plenty; but the placer diggings, after being worked over four or five times, now pay but little. Most of the old miners here now talk of ore, especially carbonate of lead, of which, from discoveries lately made, there seems to be an abundant supply. What the miners are badly in need of is a good "smelter," and from the number of discoveries now made, there will undoubtedly be good work here in a year or two, and the owners will realize largely if the works are well-managed.

We, three of us (partners), are now working a mine a short distance (about 1½ miles) south of New Oro, and near the timber line, at an altitude of 11,000 feet. This mine promises splendid results, yet we have to ship our ore to Alma, a distance by the road of 70 miles, and pay freight at the rate of $27 per ton. At the rate we are now shipping, our freight bill by April will be over $4,000—the most of which sum we would save if we had a good smelter within reasonable distance of the mine.

A short description of our mine may be of interest to you, or your readers if you publish this. We call it the J. D. Dana. It is a contact vein showing five to six feet of *solid ore*, mostly galena and carbonate of lead, and a little iron. The galena mills 42 per cent. lead, and 150 oz. silver ; carbonate, 60 oz. silver, and 44 per cent. lead ; granular carbonate, 150 oz. silver, and rich in lead. And we have sorted out one ton of ore that samples 3,000 oz. silver, and picked specimens assay over $20,000.

If you see fit to publish this letter, you are at liberty to do so. I am one of the owners of the Dana, and am anxious to see a good smelter here at an early day, and it will undoubtedly pay the owners well. Yours truly, C. W. D.

DRIVING GALLERIES WITHOUT THE USE OF POWDER.

In a previous number we described the needle-wedges in use in the Seraing collieries, and the improvements made in them by M. Ch. Demanet.* We now have to speak of an improvement in the method of driving in the wedge, as a man's power seems to have been not always sufficient to bring about the desired result, and the operation thus carried on was slow. This invention is due to MM. Dubois and François, Seraing, whose rock-drill has done such good service in the works of the St. Gothard Tunnel.

The inventors contend that the driving of drifts by the aid of powder in fiery mines has always been the chief cause of explosions, and they believe that so long as powder or other explosives are employed, especially in galleries in the coal, these dreadful calamities will be perpetuated. To combat the idea that the use of explosive agents is indispensable, and that the working of a colliery would become difficult, if not impossible, without their use, MM. Dubois and François have set themselves the problem of driving galleries economically without the use of powder ; and trials which they have made at the Marihaye Colliery have satisfied them that the solution is possible. With their machines the driving of coal drifts has proceeded with rapidity, probably with economy, and certainly with the greatest safety.

The machine with which the trials were conducted was entered in Class VI. (Belgium) at the Brussels Exhibition, and was awarded a silver medal. It consists of a large-sized rock-drill, mounted on a carriage, the principal portion of which is a cast-iron chest serving as an air reservoir. This rock-drill moves along on a screw of large diameter, and is capable, owing to an arrangement borrowed from steam-cranes, of being manœuvred so as to bore perpendicular or oblique holes, in the roof or sides of the gallery, to the right or left, and of a diameter of 8 to 10 centimetres (3 inches to 4 inches), or even more.

The first hole bored the full length of the travel, or feeding power, of the drill (about 70 centimetres=27 inches) in the portion of rock to be operated upon, constitutes the first operation, as it offers the least resistance. The chisel is then taken out of its holder and replaced by a mass of iron weighing from 30 to 40 kilogrammes (66 lb. to 88 lb.), keyed on to the holder in the same manner as is the chisel. After the introduction of a needle-wedge into the prepared hole, the machine, not having changed its position, and armed with the mass of iron, acts on the wedge like a hammer, and with repeated blows causes the rock to cleave.

The following examples will serve to show the rapidity, as well as the facility with which the work is carried on. In the driving of a gallery in a seam 30 centimetres (about 1 foot) thick, in very hard measures (graywacke, with bands of sandstone), which served for the first trials, the boring of a hole 70 centimetres (27 inches) deep, and from 8 to 10 centimetres (3 inches to 4 inches) in diameter, occupied, including the placing of the chisel, fifteen minutes ; and the introduction and driving of the needle-wedge, ten minutes ; that is to say, twenty-five minutes was the time required by a complete operation. This is equivalent, as far as the work and the result in bringing away the rock are concerned, to an ordinary shot-hole, 70 centimetres (27 inches) long, but without being attended with its dangers and its numerous disadvantages.

The following are the principal dimensions and data of the machine :

Diameter of piston, 0·11 metre=4·3 inches.
Diameter of piston rod, 0·085 metre=3·3 inches.
Weight of portion striking the wedge, 120 kilogrammes=2 cwt. 1 qr. 12 lb.
With air compressed to three atmostpheres, the percussive force of the blow will be 300 kilogrammes=5 cwt. 3 qr. 17 lb.
Total weight of machine, 1,700 kilogrammes=1 ton 13 cwt. 1 qr.

—*Colliery Guardian*, January 5, 1877.

STATEMENT OF THE STOCK, PRODUCE, CONSUMPTION AND EXPORTATION OF REFINED COPPER (by F. W. Heyne & Bro., Brokers, New York) :

Stock, January 1st, 1876		14,000,000 lb.
Product.—From the mines at Lake Superior, 24,000 tons mineral, @ 75 per cent.	36,000,000 lb.	
From Baltimore, Tennessee, etc.	5,000,000 "	
		41,000,000 "
		55,000,000 "
Consumption.—Home consumption	28,000,000 lb.	
In the manufacture of metallic cartridges for export.	3,000,000 "	
		31,000,000 "
		24,000,000 "
Export.—From January 1st to December 31st, 1876 (against 7,000,000 lb. in 1875)		16,000,000 "
Stock December 31st, 1876		8,000,000 "
Arrivals.—Expected from Lake Superior during the winter months, by rail	5,000,000 lb.	
Expected from Baltimore, Tennessee, etc	2,000,000 "	
		7,000,000 "
Supply until end of May		15,000,000 "
Consumption.—Estimated for January until May, included	12,000,000 lb.	
Export.—The balance of previous contracts still to be shipped.	2,000,000 "	
		14,000,000 "
Stock, end of May, 1877		1,000,000 "

*See *Colliery Guardian*, December 15, 1876, p. 947.

AN OUTLINE OF ANTHRACITE COAL MINING IN SCHUYLKILL COUNTY, PA.*

By J. Price Wetherill, Tremont, Pa.

(*Continued from Page* 41.)

Breasts are worked by the miners under either of two arrangements, according to the requirements of the seam:

1. "By the run," as it is called, where they receive a sum per lineal yard for driving a breast of a specified width, it being the duty of the mine boss to see that the proper width is maintained.

2. "By the wagon," where they receive a sum per wagon for properly cleaned coal, the width of breast and lineal distance not entering into the account.

Breasts are worked under the first arrangement only where the pitch is so great that the men working them cannot keep up to the face of the work without supports, or, in other words, where the pitch exceeds 40°.

Breasts worked by the run may be opened several ways: the most commonly used are illustrated in Figs. 5, 6, 7 & 8, which are plans in the plane of the seam.

In the plan shown in Fig. 5, which is the one most frequently used, four strong props (of 8-inch timber) are set at *a a* and *a a*, just above the stump. Against these, two log batteries (*b b*) are built, in each of which an opening is left that will permit large lumps to pass through freely, say four feet square. The miner then starts his work, and the coal cut is allowed to fill the space excavated, just enough being drawn from the shutes to leave room at the face for him to work. It is, however, necessary to provide means by which air shall be supplied across the face of the breast, and this is done by keeping a small opening in each side of the breast, marked D, so that the air may ascend on one side, cross the face, and descend on the other. The arrows indicate the course of the air. These openings are called manways, and are timbered in the manner shown, being made as near air-tight as possible, with 2-inch plank nailed against the upper side of the timbers. It will be observed that each timber is notched into the pillar to keep it in place. These timbers are called "jugglers," and are set four, five, or six feet apart, as may be most convenient for the men in carrying up the planks.

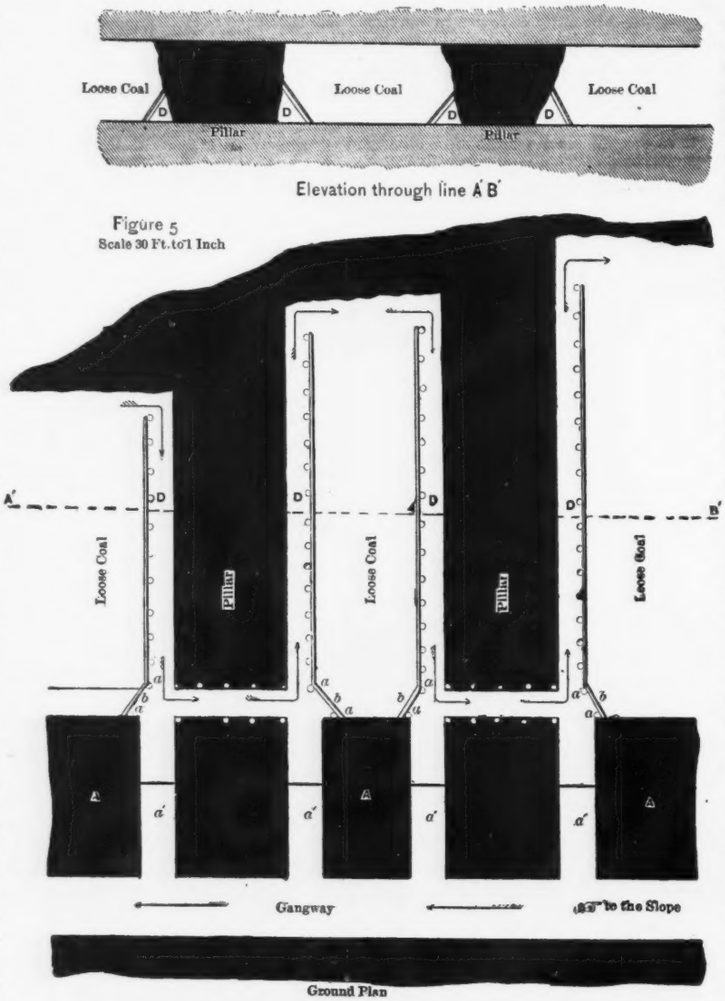


Figure 5
Scale 30 Ft. to 1 Inch

As the driving of the breast progresses, the manways are constructed, and should never be allowed to be more than six feet from the face. The great body of the coal is retained in the space marked "loose coal," until the distance is reached to which it may be desired to drive the breast, in order that the men may have a support to keep them up to the face on which they work. After that distance is reached, the coal is drawn from the openings in the log batteries *b*, until it is exhausted. It will be observed in this method that in case any accident should happen by which one of the manways in a breast should be obstructed so as to prevent or very much lessen the circulation of the air at that point, all the breasts inside of it would be deprived of ventilation until it was repaired. This, in seams making much fire-damp, would be a most serious delay, and the plan shown in Fig. 6 is used to overcome this defect.

The breasts are started with only one shute, which is in the center, instead of two, one in each side. At the heading, three strong props (*a*) are set to sustain a log battery, which may have one or two openings to draw the coal from, as may be desired. The breast is gradually widened in the manner shown, until the full width is reached, the manways D being timbered and planked as in Fig. 5. At the center (*a*) of the three props, a stopping is put in which turns the air up into the inside manway, and it is carried across the face and down the outside one, as shown by the arrows.

Should any accident obstruct either of them by opening the [stopping *a* across the heading, the breast can be isolated and the current pass on to the next one, until the damage is repaired. The two manways D are made to diverge from a single shute, in order that the excess of loose coal over that necessary to keep the men at the face may all be delivered at the bottom, through them into it if necessary. It is necessary to draw the excess of coal from the manways, instead of the breasts, when the top or bottom is bad, or both, because—1st, the jugglers being notched into a soft material, are liable to become unseated by the moving mass of coal, and as it is necessary that the excess should be removed every day as fast as it is made, repairs would be required to the manways daily, and this while the miners were at work in the breast. 2d, there is less liability for the moving mass of coal to rub off or dislodge portions of the top or bottom if the mass of coal lies perfectly quiet until the breast is finished, and then is drawn out as rapidly as possible, than there is if it is moved a little each day; and should the jugglers become unseated after the breast is finished, and the men are out of it, no difficulty arises, as ventilation is no longer required in the breast.

As the single shute is always more or less full of coal, a manway is driven from the gangway to the heading between each two breasts, and is used by the men working as a travelling way both to and from their work.

Fig. 7 shows a plan in which an additional stump A' is left to keep open the heading which is continued across the breast. The stopping *a* in the heading opposite the center of the breast, if removed, would isolate the breast in case of accident as above. As this coal can all be taken eventually, there is no loss in pursuing this course.

Fig. 8 shows a system pursued in thick seams sometimes, where large quantities of gas are made. I have shown the gangway as driven against the top, which is sometimes done to give greater security to the gangway. The main feature of the plan is an air course *c*, driven against the top above the gangway, and connected with the manways E E, between each breast, by the passages F F. When the breasts are in operation the air-course *c*, called a "monkey gangway," is not used, the arrows in black indicating the course of the air; but when it is necessary to repair one of the manways D D, the course is shown by dotted arrows. The great advantage it has is in securing a permanent return for the air after the breasts are exhausted. It is, however, more expensive, as there is more narrow work to drive.

The coal made along the manways D may be drawn from the manways E. The main shute, marked "coal shute," is driven large (9 feet wide), and has a travelling-way in one side to allow a man to attend to the drawing of the coal.

In many cases all the coal in excess of what is necessary to keep the men up to the face is drawn from the breast shutes, and not from the manways, in order—1st, that the manways may not become obstructed; 2d, that the coal in falling in steep pitches may not be broken. Where this coal is thus drawn, it is desirable to draw from a center shute, instead of two side shutes, as there is a tendency in the moving coal along the manways to unseat the jugglers, which may be partially overcome by driving a third coal-shute between the two shown in Figs. 5 & 7, and drawing the excess of coal from it. This has a tendency to allow the coal along the manways and against the sides to remain at rest while the motion takes place down the center of the breast. In all places where the bottom is bad, and the breast requires to be emptied as soon after it is finished as possible, three shutes are a great advantage, as three times as much coal can be loaded from them in the same space of time as there can from one.

It will be seen that in all plans of working by the run, there is no opportunity to leave in the breast any of the impurities contained in the seam; everything must be taken out with the coal. As shown in the sections Fig. 9,

*A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, October, 1876.

the amount of unprofitable material necessary to move in some cases is excessive. As the breast must remain full of loose coal until it is driven to its destination, there is always a liability of portions of the top or bottom becoming detached and adding to the impurities, and in some cases these causes operate so seriously against working by the run that it is impossible to use the plan.

When the impurities are so great that they will fill up the space marked "loose coal" in Figs. 5, 6, 7 & 8, so as to keep the men up to the face of the breast, the good coal may be thrown down the manways, and the breast worked in that way until it is finished. If there are not enough impurities to do this, breasts on steep pitches are worked "on batteries," as it is called, where the thickness of the seam is not so great that it cannot be timbered. When the seam is over 12 feet, and so impure that it cannot be worked by the run, it is not possible to work it at all; 12 feet, and under 12 feet, may be worked on batteries.

Fig. 6

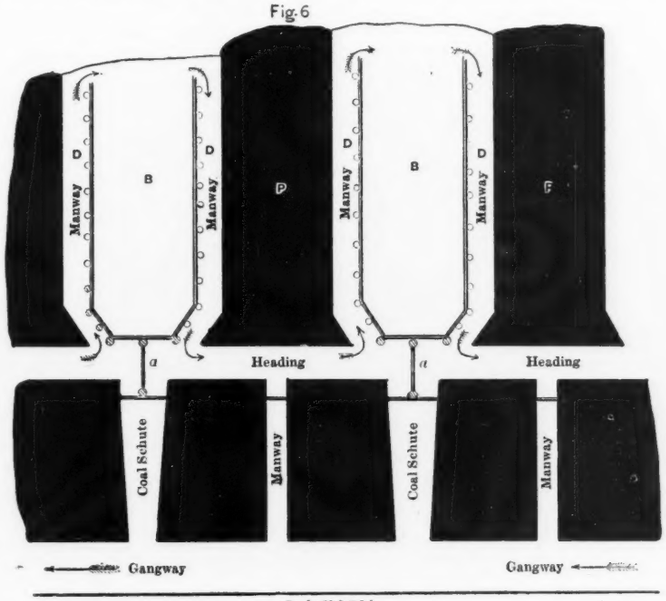


Fig. 7

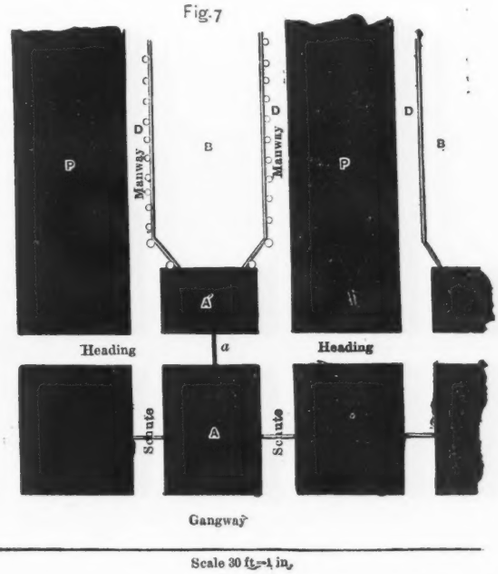
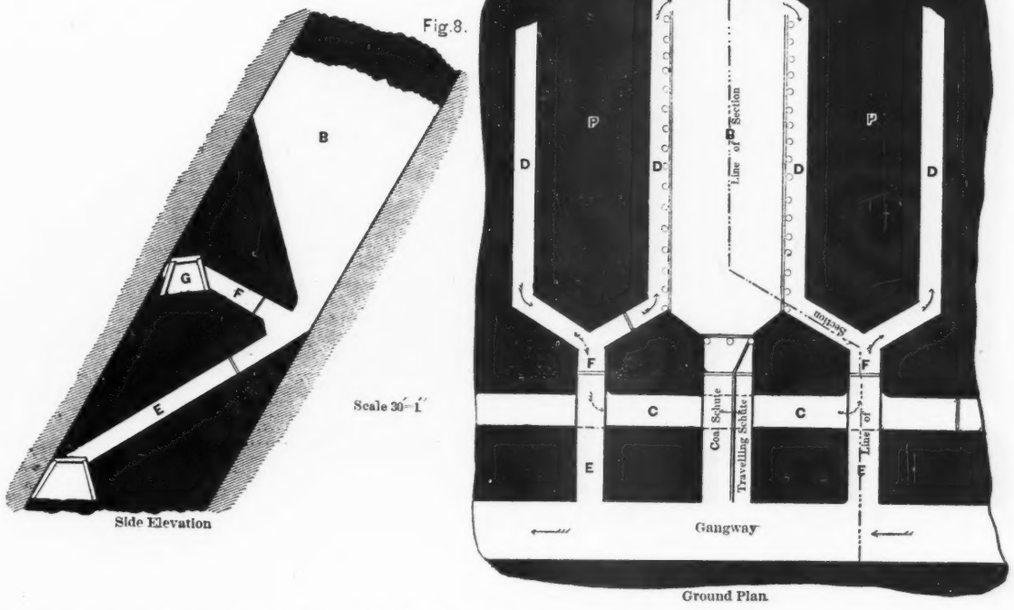


Fig. 10 illustrates the course pursued. Rows of props of 6 to 8-inch timber are set across the breast every 15 to 20 feet up the pitch as it progresses, and a few planks nailed on them, making a platform on which the men stand to carry on the work. Two manways are kept open, as in the former method, for ventilation; but it is only necessary that the inside one, or the one delivering the air at the face, should be made air-tight. As the coal is mined it falls upon the platform, and the good coal is separated from the refuse and thrown down the manways, the refuse being thrown into the breast, where it remains, occupying the space marked "loose coal" in the previous figures, and is called the "gob." Breasts worked "on batteries" are worked by the wagon. Care must be exercised, as far as practicable, to keep the jugglers and planking covered with the gob, in order that any falling portions from the top, or elsewhere, may have the force of the blow deadened, so as not to break them down, which would not only obstruct the air, but also cause the impurities in the gob to mix with whatever coal was in the manway at the time.

Where the pitch of the seam is from 12° to 40°, breasts are worked in the same manner as on batteries, except that the platforms or batteries are not necessary, as the men can keep up to the face without assistance. In all such breasts, the central space, marked "loose coal," Figs. 5, 6 & 7, is used to retain the waste matter or gob, and the good coal is invariably sent down the manways. There is an unavoidable waste in the passage from the face of the breast, caused by the lumps grinding together, which would be lessened if the manways could be kept full; but this cannot be done, because it would retard or obstruct the ventilation. The waste is not, however, as great as in the cases shown above, where the pitch is steeper. All breasts in these pitches are worked by the wagon, the coal that is produced each day being removed at once, and a great advantage is thereby secured over breasts worked by the run, where the coal cut must remain in the breast until it is finished, in that the liability of

Fig. 8.



portions of the top or bottom to be detached and mixed with the coal is entirely removed.

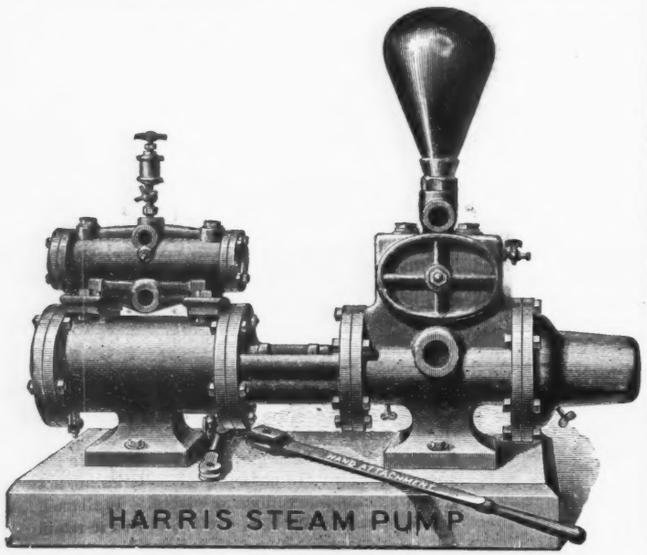
From 12° to 28° the manways must have sheet-iron laid on the bottom, as the coal will not slide on the irregular bottom of the seam, and in the lighter of these pitches, say 12° to 28°, it must be pushed by hand down on the sheet-iron.

TO BE CONTINUED.

THE HARRIS DIRECT-ACTING STEAM PUMP.

Owing to their greater simplicity and lower cost, direct-acting pumps have become exceedingly popular in this country, and are also being quite generally adopted in Europe, to the exclusion of the expensive Cornish pump and other complicated pumping machines. We illustrate herewith one of the most simple, compact and efficient of these modern direct-acting pumps. The sectional cut shows very clearly the arrangement of the parts, and renders a long description of them quite unnecessary. This pump is of the double-acting plunger type.

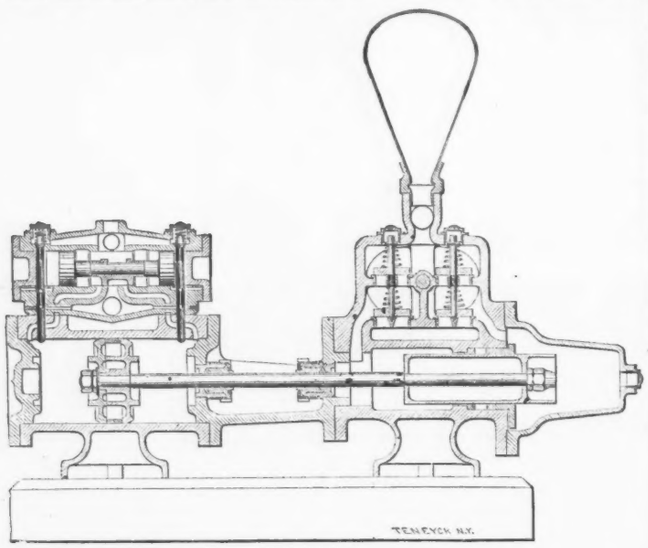
The main piston, when it arrives near the end of its stroke, raises one of the



poppets; this admits steam to the valve piston, and at the same time closes its communication with the exhaust; this throws the steam valve, which admits steam to the other side of the main piston, causing it to make the return stroke; the instant the piston moves from under the poppet, it drops to its seat, closing the steam valve and opening the exhaust on that side of the valve piston, which, together with the steam valve, remains at rest until the other poppet is raised to admit steam to the opposite side.

This pump has no outside connections—tappet arms, valves, stems, collars, cranks, eccentrics, fly-wheels, etc.

The plungers, in sizes where it is practicable, are made of seamless drawn tube, and consequently can be replaced at very small cost; or, in localities



where brass tube is not at hand, iron gas pipe, or even a block of green wood, will answer.

The water cylinder can never be worn out nor require re-lining, as the packing is the only part that comes in contact with the plunger, and it is easily replaced by removing the bonnet on the end.

By removing the cover on either side of the water chest, access is had not only to the space above the valves, but that also underneath them. The poppets can be examined by removing the screw caps on the steam chest and lifting them out.

Pumps of this make are adapted to all conditions of service, are exceedingly simple and substantial in construction, can be run at the very highest speed with safety, or will run down to one stroke a minute without stopping on the center. Their working parts are made so as to compensate for wear; are interchangeable, and easily accessible. The workmanship and performance of every pump is fully guaranteed by the manufacturers—the Reading Hydraulic Works. They are evidently the fruit of large experience of the requirements of steam pumps, and we understand that during the past five years in which the Harris pumps have been in use they have given great satisfaction. The Reading Hydraulic Works, whose advertisement will be found in another column, have issued a price-list which gives much information with regard to the machinery manufactured by the company, and which shows for what low prices good machinery can now be purchased. Engineers and superintendents would do well to examine this price-list.

The company manufactures blowing engines also.

ANNUAL REVIEW OF THE PETROLEUM PRODUCTION FOR 1876.

DRILLING WELL DEPARTMENT.

Never since the commencement of producing petroleum has there been such gigantic efforts put forth to find some new territory where large wells could be obtained, with a broad and extended field to operate, as has been for the year which has just closed. The result of these efforts we present in the following table, showing the unprecedented number of wells drilled each month, the daily average production of the new wells, the dry holes, the large increase in the number of producing wells, together with the average production per well of the whole number producing. After drilling in all parts of the old territory and extending their operations to the outskirts of all the once rich and prolific fields, and reaching far in advance of production in some supposed line or belt, we find no new fields which promise to increase the amount produced, or to keep up the supply to its present limit.

DRILLING WELL DEPARTMENT FOR 1876.

Table showing the number of wells producing, drilling and finished each month, with their average daily production:

Months.	Wells completed.	Daily av. prod. of new wells.	Producing wells.	Daily average of all wells.	Drilling wells.	Rigs building	Dry Holes.
January....	111	14·5	3,314	7	142	127	12
February..	88	16·1	3,638	6·3	151	175	10
March.....	98	14·7	3,670	6·3	230	191	12
April.....	127	12·8	3,772	6·2	267	221	27
May.....	168	11·9	3,930	6	307	249	21
June.....	207	11	4,527	5·4	340	243	28
July.....	195	14	4,774	5·3	353	231	28
August....	170	13	5,047	5	374	381	45
September	209	11·3	5,285	5	511	382	29
October..	273	10·3	5,552	4·6	565	364	39
November.	272	10·4	5,809	4·5	6.8	293	38
December.	272	9	6,000	4·3	493	271	41
Total.....	2,290	12·5		5·6			330

PRODUCTION.

The amount of crude petroleum produced each month during the year has been as follows:

	Bbls.		Bbls.
January	712,225	July	763,023
February	668,885	August	782,223
March	718,177	September	780,600
April	701,490	October	809,162
May	735,351	November	786,480
June	723,000	December	787,090

Total for the year	8,968,906
Daily average	24,572

STOCK AND SHIPMENTS.

	Bbls.
The total stock of crude and refined, reduced to crude equivalent, held in the producing regions at the commencement of the year was	3,550,207
Produced during the year	8,968,906
Add excess in stock by gaugers September 1st	223,538
Total amount	12,742,651
Shipments out for the year	10,191,452
Leaving in stock January 1, 1877	2,551,199
Being a decrease for the year of	999,108

Shipments of crude and refined oil out of the producing regions to the following points during the year:

	Per ct.		Per ct.
New York took	24·5	Consumed by fire took	2·5
Cleveland "	22·5	Baltimore "	2·1
Pittsburg "	19·1	Boston "	1·8
Creek Refiners "	14	Local Points "	1·6
Philadelphia "	8·7		
Ohio River Refiners took	3·2	Total	100·0

—*Petroleum Reporter.*

THE FOLLOWING ARE THE populations of the various States of Europe, according to latest estimates:

Germany, 1875	42,723,242	Spain, 1870	16,551,647
Austro-Hungary, 1876	37,700,000	Andorra	12,000
Switzerland, 1870	2,669,147	Portugal, 1874	4,298,881
Netherlands, 1875	8,809,527	Italy, 1875	27,482,174
Belgium, 1874	5,336,634	Monaco, 1873	5,741
Luxemburg, 1875	205,158	San Marino, 1874	7,816
Russia, 1870	71,730,980	European Turkey	8,500,000
Sweden, 1875	4,383,291	Roumania, 1873	5,073,000
Norway, 1875	1,802,882	Servia, 1875	1,377,068
Denmark, 1876	1,903,000	Montenegro	190,000
France, 1872	36,102,921	Greece, 1870	1,457,894
Great Britain, 1876	33,450,000		

The dates indicate the years in which the data were obtained on which Behm and Wagner have based their estimate. In the case of Great Britain, of course, the estimate is founded on the returns of the Registrar-General, for there has been no formal census since that of 1871. In the case of other countries in which the estimate is given for the years 1875 and 1876, it is the result generally of a regular census, for several Continental Governments are not content, like ourselves, with a census once every ten years.

ON THE VOLUMETRIC DETERMINATION OF SULPHUR AND AMMONIA IN ILLUMINATING GAS, WITH A DESCRIPTION OF THE APPARATUS EMPLOYED.*

By H. E. Sadler and B. Silliman, of New Haven, Conn.

INTRODUCTORY NOTE.

The research here recorded was undertaken early in the present year, and has been prosecuted steadily for about eight months. While the work has been under my constant supervision and advice, the labor has all been performed by Mr. Sadler, to whom is chiefly due the development of the successive steps which have led to the final result. The process is better than I dared to hope, and we are able to place at the command of chemists and engineers interested in the matter an apparatus of continuous and uninterrupted action, and methods of analysis by which the daily averages of the two variable and inconstant factors of illuminating gas, ammonia and sulphur, may be determined with all needful accuracy, even by those little skilled in chemical manipulation, and with very little loss of time.

This research has been carried out in the laboratory of the New Haven Gas-Light Company. B. SILLIMAN.

October, 17, 1876.

INTRODUCTION.

In making some determinations of the sulphur in coal gas by the Letheby apparatus, the importance of some simpler process was forcibly suggested by the experience, skill, expense, and time required to obtain trustworthy results. The chances of error were numerous. Insufficient washing of the apparatus, with the liability of breakage in daily handling, the care required in the concentration and in the expulsion of the ammonia, the varying solubility of Barium sulphate in presence of indefinite quantities of ammonium nitrate and free acid, the tendency of that precipitate to run through the filter, the opportunities for loss in the incineration and ignition, the expense of the analytical balance, with the delicacy of manipulation which it requires, and, above all, the time involved—from four to eight hours after the gas is burned,—all these seemed to place the Letheby test beyond the possible for the practical gas manager.

To escape, without the sacrifice of accuracy, these numerous drawbacks was the end proposed. The result attained is a simple process for the volumetric estimation of the sulphur, dispensing with the balance, and requiring but ten minutes for a determination. The apparatus at the same time affords the working engineer a continued and ready check upon all his purifying processes except the removal of the tar.

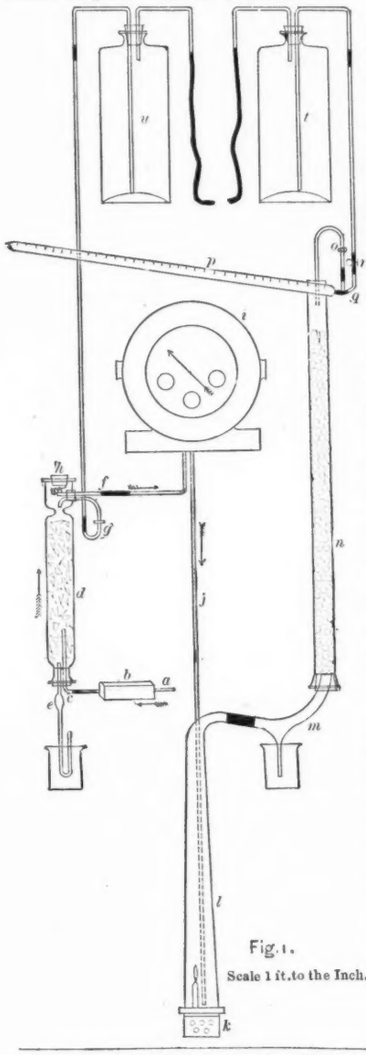


Fig. 1.

Scale 1 ft. to the Inch.

DESCRIPTION OF THE APPARATUS.

The apparatus represented in Figure 1 is of glass, except the governor *b*, the meter *i* with its connections, and the burner with its case *k*, which are of metal. *d* performs the office of a scrubber. It is an inverted calcium chloride or bubbling tube, of about 600 c.cms. capacity, with a third hole drilled for the admission of the stopper *h*, which carries a wire to support ammonia, acid, and hydrogen sulphide test papers. The larger cylinder is filled with broken glass and supplied with standardized acid from the bottle *u*, by means of the syphon tube *g*, which is fitted with a stop-cock. The gas is admitted by the tube *c*, extending 5 cms. into the cylinder, and the acid escapes into a beaker below by the tube *e*, which is bent to form a seal. The meter and burner are substantially those used by the Referees.† The adapter or eductor *l* is 50 to 60 c.cms. high, the diameter at the base about 7 cms., and the smallest internal diameter at least 1½ cms. *m* has a diameter of 2 cms., with an opening drawn out at the bottom for the escape of the drip from *n*. *n* is a strong tube 3½ cms. in diameter by 80 cms. long, filled with glass marbles 1½ cms. in diameter. This tube serves as a condenser and also to break up the ascending current from the burner and bring it into intimate contact with a standard alkali, dripping upon the marbles through the tube and stop-cock *o*, from the pipette *p*. This measures 200 c.cms. by halves, and is 60 cms. long. At the beginning of an experiment it is filled by the three-way pipe *q* from the bottle *t*, by opening the pinch cock *r*.

The apparatus is most conveniently mounted against the wall; the meter and bottles standing upon shelves, and the burner and beakers upon swinging brackets. The remaining parts are then secured by clamps driven or screwed into the wall.

MODE OF MANIPULATION.

Solutions of caustic soda or potash and an acid, sulphuric or oxalic, are provided of such strength that 1 c.c. has a saturating power exactly equal to 1-10 grain of sulphur in the form of sulphurous or sulphuric acid.* The containing bottles and the pipette being filled, the gas is lighted and regulated by the governor, as near as may be to the rate of ten feet in twenty-four hours. The stop-cocks in *o* and *q* are then opened so that 10 c.cms. will pass each for one foot of gas burned.† After half an hour or an hour, when the apparatus has at tained its normal working, a clean beaker is placed under each drip, while the meter and the quantity of alkali solution in the pipette are accurately noted.

When, thereafter, 10 feet have passed the meter, which will be in about twenty-four hours, the quantity of alkali which has flowed from the pipette is determined and the beakers are removed, others being substituted if a test is desired for the following day.

The free and carbonated alkali present in the drip is then to be saturated with the standard acid, but since with litmus and even with cochineal‡ the carbon dioxide obscures the point of neutralization, it is best to add a quantity of acid equal to the total alkali used, and, after removing the carbon dioxide by boiling the liquid for a brief interval, to titrate back with the standard alkali. The number of c.cms. so used expresses the number of grains of sulphur in 100 feet of gas. For the alkali received in the drip being just saturated by the standard acid, the free acid there will be the quantity caught from the gas. Now, since 1 c.cm. of the alkali finally added is saturated by one-tenth grain of sulphur, one-tenth of the c.cms. added indicates the number of grains caught from the 10 feet burned, and ten times this, the quantity of sulphur in 100 feet.

The acid solution used in the scrubber is also measured and the acid remaining free determined by the standard alkali. The difference expresses, as in the case of the sulphur test, the number of grains of sulphur which can be neutralized by the ammonia in 100 feet of gas. Since 1 grain of sulphur neutralizes 1 1-16th grains of ammonia, if the number of c.cms of acid neutralized by the ammonia be increased by 1-16th, the sum will express the grains of ammonia in 100 feet. This may be accomplished mechanically by having the ammonia measuring-glasses graduated so that 17 divisions shall be equal to 16 c.cms.

The conditions indicated are the most convenient for continuous daily determinations. They are not essential to successful working. On the contrary, two feet of gas are sufficient to give reasonably accurate results, and the apparatus has not proved unequal to a rate of one foot per hour. Moreover, much less acid, run through the scrubber, would be usually sufficient. The quantity of ammonia to be arrested during the period of these experiments was abnormally large, pending a rearrangement of the scrubbers at the works.

EFFICIENCY OF THE APPARATUS.

The following results were obtained from an apparatus which differed from that figured only in that the eductor *l* and the condensing tube *n* were each one-third shorter than described. It was worked first in comparison with the Letheby test, taking the gas from the same supply pipe, and burning it during the same interval, at nearly the same rate, about two-thirds of a foot per hour. From two to four feet, according to convenience, were taken for each experiment.§ The Letheby was supplied with about 100 c.cms. concentrated liquor ammonia. However, this rule was not invariable, and, with three or four of the experiments which cannot now be specified, a weaker solution was used. No result, however, is reported, or was worked out, in which at the end of the burning an exposure of three seconds at the escape failed to turn tumeric paper deep brown. The condensation and washings were evaporated on the water bath to about one-half, acidified with bromine, heated to expel any great excess, precipitated while boiling with barium chloride, allowed to settle, the supernatant liquid, and finally the powder, decanted on to a filter, washed with hot water so long as the washings showed the presence of barium, dried, ignited and weighed, the filtrate being always tested for sulphuric acid.

The other apparatus was supplied with from nine to twelve c.cms. of the standard soda solution for each foot burned. The gas was taken direct from the governor to the meter, without the interposition of the ammonia test, and the drip having been slightly acidified with hydrochloric acid, and further, with bromium water, was boiled, and the contained sulphates precipitated hot with barium chloride, and treated thereafter as in the Letheby determinations.

The following table gives the results:

TABLE A.

Date.	Sulphur Caught. Grains per 100 feet.	Sulph r caught by Letheby. Grains per 100 feet.	Excess over Letheby. Grains per 100 feet.
May 15....	18·64	12·44	6.20
" 16....	19·62	13·70	5·92
" 17....	18·54	14·01	4·53
" 22....	19·33	12·38	6·95
" 23....	18·15	12·11	6·04
" 24....	17·64	11·64	6·00
" 25....	16·58	13·04	3·54
" 26....	14·25	10·21	4·04
" 27....	18·43	10·47	8·43
Total...	161·65	110·00	51·65

Average gain over Letheby.....46·95 per cent.

The only means at hand for comparing the new apparatus with the referees is through the Letheby. In their description of their test, before referred to, a

* A paper read before the American Institute of Mining Engineers at the Philadelphia meeting, October, 1876.

† First report of the Gas Referees upon the sulphur question, July 13, 1870. Reported in London Journal of Gas-Lighting, etc., August 16, 1870.

* The standard solutions can be purchased of chemical dealers, and no balance will then be needed. They may conveniently be made of ten times the strength indicated, and portions withdrawn and diluted to this strength as required.

† Great difficulty was experienced in securing an uninterrupted and uniform flow of the solutions. The purest distilled water seemed to carry down impurities sufficient to choke the capillary opening of the stop-cocks, which at the proper rate pass but four drops per minute. Filters of Swedish paper, of cotton batting, of fine linen cloth, and of sand, were tried in vain. The simple device of passing the solution through the stop-cocks in ascending, instead of descending currents, which placed the force of gravity in opposition to, instead of in accord with the slow suction of the streams, afforded instant and complete relief.

‡ Hæmatoxylin was first chosen as an indicator, both because it is the most sensitive to minute quantities of free acid and alkali, and because the change of color, yellow to port wine, is the most conspicuous. But in this solution the reaction was very unsatisfactory. The color changed gradually from yellow to reddish-brown. The absence of metallic salts, at least of the heavy metals, was well demonstrated, and there seemed no explanation of the phenomenon, except that the coloring matter was oxidized by the nitrous acid present and rapidly destroyed. Cochineal was therefore substituted, and proved very satisfactory.

§ It may be remarked that in the Letheby test, as described in Sugg's "Gas Manipulations," the gas is burned in an atmosphere strongly ammoniacal. The products of combustion are carried into a large glass cylinder, where the resulting ammonium sulphite and sulphate fall with the condensing vapor of water, passing into solution. The sulphur is then converted into the form of barium sulphate, and weighed. In the apparatus used, a second condensing cylinder was added, and a trial with a further addition of ten feet of tubing, as a condenser, showed that less than one-half of 1 per cent. of the liquid escaped.

table is given in which the following determinations only are strictly comparative:

TABLE B.

Referees.	Letheby.	Excess.	Referees.	Letheby.	Excess.
Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet.
33·4	25·1	8·3	35·0	21·86	13·14
35·5	24·4	11·10	34·73	24·92	9·81
32·6	22·2	10·4	34·98	25·82	9·16
31·8	23·8	8·00	34·84	25·24	8·56
29·2	23·9	5·3	35·5	25·4	10·1
29·6	24·9	4·7	36·26	25·12	11·14
31·17	24·9	6·27	27·4	18·4	9·0
31·4	25·4	6·0	28·	19·2	8·8
32·27	25·8	6·47	27·7	23·3	4·4
32·8	25·24	7·56	26·6	20·6	6·0
31·6	24·32	6·28	28·03	20·4	7·63
32·95	23·96	9·			
34·41	23·35	11·06	379·85	577·53	107·68

Average gain over Letheby..... 34·2 per cent.

And in the place cited, Dr. Odling reports the following comparative workings:

TABLE C.

Referees.	Letheby.	Excess.	Referees	Letheby.	Excess.
Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet.	Grns. Sulphur per 100 feet	Grns. Sulphur per 100 feet.
26·41	21·04	5·37	21·04	17·48	3·56
25·60	19·32	6·28			
21·33	19·76	1·57		77·60	16·78

Average gain over Letheby..... 21·6 per cent.

A comparison of these workings seems to indicate that in efficiency this apparatus does not differ materially from that of the referees; for while the percentage of gain over Letheby's is considerably larger, it will be noticed that the quantity of sulphur to be caught was less, and the actual number of grains caught in excess of the Letheby is in favor of the referees' test. Perhaps no apparatus arrests absolutely all of the sulphur, and the real usefulness of sulphur tests consists in indicating the relative amounts of sulphur in the gas from day to day.

A consideration of these tables forces upon one a conviction of the entire worthlessness of the Letheby test for even this purpose, a defect which the experience and carefulness of Dr. Odling himself has not overcome.

A third sulphur test is that of Mr. F. J. Evans, who drew the products of combustion through an alkaline solution contained in Woulfe bottles. It is to be regretted, in this connection, that no figures could be obtained showing the result of his workings and affording a comparison of the new test with his, and that no opportunity has been offered to compare its simplicity or accuracy with the test devised by Mr. Vernon Harcourt, and described at the last meeting of the British Association of Gas Managers.

TO BE CONTINUED.

ABSTRACTS OF LECTURES ON MINING.—No. XXVII.

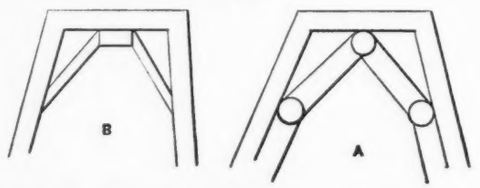
By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(From the London "Mining Journal.")

IN the last lecture we considered some of the methods of timbering in levels of ordinary width, where the ground above and at the sides presents no special difficulty. In all these cases there are many special points to be attended to practically which cannot be set forth in a course of lectures. Beside this there is great variation in different districts as to the cleverness of the men in setting the timber to the best advantage. For instance, in some cases there is great temptation to notch and cut the timber in different ways, so as to put it together with spikes and nails, all being methods tending to destroy the strength and tenacity of the fibres, and thus diminish the amount of resistance which the timber ought to bear. Again, you may sometimes see the curve of the timber, when a curved piece has to be used, placed the wrong way; it should be placed so that the pressure acts on the convexity of the curve. It may be as well to remember that sometimes timber which has been used for other purposes may be very conveniently used, as, for instance, timber from wrecks, where cheapness is a great consideration. Another point of great importance must be attended to, where the frame-work of the timber is lined with board, laths, laggings, or bars, as they are variously termed, that no hollow space should be left behind any of them. If a wall or roof does not press firmly against the planks, &c., something should be introduced to wedge up the space; otherwise, on a sudden rupture of the ground, the masses would be rendered much more dangerous from the fall they would have, and would descend on the timber with the force of a hammer. Another point to be looked to, especially in working stratified deposits, inclined at various angles, is that the timber should be placed in the most satisfactory way—at right angles to the direction of the gallery. In working the deposits which are inclined at high angles, as in Belgium, Pembrokeshire, some instances in the Bristol coal-field, &c., the roof may be such as to require a special support beside the usual frame-work; then the laggings are put in, and often brushwood, or other such substance, placed between, to prevent the great pressure forcing the small material through into the drift-ways.

We come next to the timbering of larger spaces. Lodes remarkable for their width often give a great deal of trouble in the matter of timbering; sometimes the difficulty is got rid of by occupying only a small portion of the lode for levels, filling up the rest with broken stone. Such a plan answers very well when there are no deeper levels to deal with, but, as a rule, while one level is being worked shafts will be sinking lower, so as to open out lower levels from which to work up to the first ones; consequently the upper part must be supported, and this will mostly be by timber. In some of the Austrian salt mines, in the district of Salzburg, they have found great difficulty in supporting the walls and sides, from the tendency of the salt to press with very great force. It is a notorious matter in some of our mines in England that when they have to be driven through argillaceous materials, especially at great depths from the surface, the timber gets pressed together so much that it may be necessary to renew it within five or six months after the first driving. This, of course, gives rise to great expense, and various methods have been tried for overcoming it, but we cannot say at present with any great success. In the salt mines, for example, taking the form of level best adapted to resist pressure, it has been proposed to line the whole with blocks of wood, carefully cut and fitted together, like so many blocks of stone in masonry. In a country where wood is abundant this method might be carried out with a good deal of advantage, and in cases where it has been tried it is said to have been successful, more so as regards the longitudinal joints than others. In some cases the blocks have been alternately short and long, in others banded together as so much stone; or in some cases, again, one piece was partly inserted into another. The expense, as compared with ordinary timbering, was so great that it was found better to adopt the latter, and timber over two or three times. In the Great Comstock Lode they have adopted a form of level very much like that of the old men's levels, and they use very thick timber, 8 to 13 inches square, carefully jointed together; the entire frame consisting of a cap piece, sole piece, and two pieces on each side. It is stated that this is the only form of timbering which has been at all successful in some of the mines, especially with the addition of strong lagging behind, sometimes as much as 2 or 3 inches thick. When the breadth of working becomes so great that the cap pieces are apt to give way, various methods of supporting them are adopted. The timbering then becomes very expensive when you have cap pieces 8 or 9 feet long. In the iron mines of Furness the distance of working are 9 or 10 feet square, so that the cap pieces, as well as the stanchions, have to be of great size, and the cost of timbering very great. If the principal part of the strain be from above on the cap pieces, it is very simple to place struts beneath them. In the passby, for instance, in the ordinary road of a mine it is the simplest plan to put in a single prop in the center of the cap piece, or sometimes it may be a small piece of walling. In the metallic mines this cannot be so conveniently done, because you have to consider that the base is not permanent, for while you are probably sinking your shafts to a lower level, with the object of working up to the former one, under these circumstances, therefore, comes in the method of struts. In some German mines, where a considerable length of cap is used, and mostly where the lodes are very vertical, and you want to avoid resting the cap piece on the floor, it may be supported by struts hitched against the walls In some instances, again, the cap may be used in two pieces, as being less expensive, each piece resting on a longitudinal piece down the center, the latter piece being supported by struts as before. In some of the mines of Southern France, in addition to the longitudinal piece supporting the cap, there are similar pieces along the walls, and these have struts between them (Fig. 28, A), and this method seems to have done very good service indeed. In other cases for the purpose of getting more head room there is a smaller cap piece at the top between the side struts. (Fig. 28, B).

Fig. 28.



The reliance will be, at least in the first instance, on stull pieces put in in the usual manner, but then one portion will have extra support in order to serve for purposes of travelling. The falling piece of the cap and the leg are footed on another transverse beam, laths are placed by the side of the timber, and then a quantity of refuse is stacked behind. This refuse, after it has been exposed to the pressure of the ground for some time, will give a good solid structure which will not be liable to collapse. This method is used where the lodes run from 10 to 12 feet wide. If we take another case, in the Great Devon Consols Mine, where the lode runs from 20 to 22 feet wide, we find a stull piece 22 feet long and 20 inches square; at some distance above comes another piece, 16 inches square, carrying the laths or planks on which the attle will be stacked. This latter piece is taken up below by means of 10 inch struts, or uprights, which rest on the first-mentioned stull piece. The greater part of the space between the upper and lower piece is filled with attle, the rest is left for travelling. Another variety of timbering where the lode is 24 feet in breadth is as follows: the leading point to begin with is to have a sole piece let well into the walls of the lode to a depth of 12 to 18 inches, resting, therefore, on a kind of bracket; this piece is of red pine, 18 inches square. Footed on this sole piece are two pieces of 18-inch timber, which meet together at an angle above, at which point there is placed a longitudinal piece: sometimes these are additionally strengthened from below by other pieces within, and then by a transverse bar; and as they have to support a strong weight of attle, often from 10 to 50 fms., strong 3-inch planks are usually put in. Sometimes these pieces are made compound, and held together by strong iron clamps.

In some cases it has been proposed, and with a certain amount of success, to replace some of these wooden props by iron ones, and cast-iron props were recommended 25 years ago for use in some Yorkshire collieries. At the top of the pillar was a kind of capital, and on this rested a piece of wood, so as to give the prop a good bearing on the roof. The wooden portion was generally so broken after once using that it could not be used again, but it was intended that the iron props should be hooked out and used over and over again. Generally the props had a strongly flanged section: they answered their purpose pretty well, but were not followed out. Since then it has been proposed in the North of England to have iron props made in two pieces, jointed together by having a piece slid over them; these answered their purpose pretty well, but the method cannot be said to be a great success. According to some the working is economical, according to others the loss from breakage is very great. Experiments have been made on a large scale in some Continental districts as to the use of wrought-iron, and a year or two ago the lecturer had visited some districts where these wrought-iron props were in use. This was especially the case in some Saxon collieries, where the pressure was so great as to destroy everything else except these props. A number of experiments had been carried out as to the best shape and size of the props, and it was found that the best shape was to put them in the levels in the form of an ellipse; in one particular case this was 6 feet 6 inches high by 4 feet 6 inches wide. The section of the iron was something like that of a T-headed rail, the broad part being placed against the rock; sometimes they have been put in with only one joint at top, in other cases with a joint above and below. The best way of securing the joints is the simple one of having a collar sliding over the two pieces at the joint. The lecturer had also seen them of a horseshoe shape, resting on a

flat piece below, and having dimensions as great as 10 feet 6 inches high by 8 feet 6 inches broad, but this form is not so strong as the former.

All the above arrangements require that you should have a certain amount of suitability in the ground about for there to be security. But in collieries sometimes, in metal mines frequently, there are cases where it would be impossible to put in successfully an arrangement of this kind without further precaution. Even in the Cornish granite there are cases where you could not get on in this way, because the men would have no time to get in the timber before they would be overwhelmed. For instance, on the eastern side of Newcastle an attempt was made at the colliery of St. John's to get the High Main seam, but the attempt to work it was interrupted by what looked like an ancient river bed. In the St. Lawrence colliery a drift was attempted to be driven, but failed at first from the weakness of the timber; then it was carried on by horizontal spilling, followed up by close timbering. After the level had been driven for some distance the bottom stone disappeared—went down underfoot; the floor also was therefore planked, and they pushed on the drift through gravelly quicksand and water to a distance of 32 yards: this was done by the method to be presently described. But this was found very expensive, and judged an imperfect plan, and moreover was liable to be interrupted by occasional gushes of water and sand at great pressure, so as to endanger the whole colliery, consequently the attempt was at last abandoned. To take another case which often occurs in metal mines: you may have in one part of the mine the ground so hard that it is difficult to make way through it at all; in other parts you may have the ground so soft that the difficulty will be to remove the material, and to get the opening secured.

In examining a cross-cut from the shaft to the lode you will often find it does not run in a straight line, but here and there turns to one side or the other for a distance, then runs on in the original direction. At each of these points of turning the men "lost their level"; the usual thing being that the men in cutting came to a place in the granite where the material was so soft as to ooze through the timbering, and they were obliged to take more care of the lagging, and get it as close as possible. They advanced foot by foot in this way till perhaps some unlucky joint gave way, or the men were less ready than they might be in putting in the timber; there came a rush, and the men were obliged to run for their lives. They had then to remove the material till they came to a place where perhaps pieces of timber had been laid across to keep it back; they then had to board up this part, and commence their level again on one hand or the other. There are several different methods adopted for working in such ground, known generally as spilling. These are greatly dependent on the nicety of workmanship, and the spirit and coolness of the men who carry out the work. These methods will be treated of in the next lecture.

MINING NOTES.

THE DUNBAR IRON COMPANY, Dunbar, Pa., will soon blow in its furnace with full plant, consisting of all the latest improvements in blast furnace plant, Whitwell hot-blast stoves, water boshes etc., etc.

NEW JERSEY ZINC COMPANY SUIT.—The U. S. Circuit Court, at Trenton, has granted an injunction against the New Jersey Zinc Company, at the suit of Moses Taylor. The injunction was in reference to the use of certain minerals belonging to complainant.—*Iron Era*, Jan. 20.

THE LAKE SUPERIOR IRON AND ORE SHIPMENTS FOR 1876.—We compile from the Marquette *Mining Journal* and the Ishpeming *Iron Home* the following, showing the output of iron ore and pig iron from the mines and furnaces of the Lake Superior District during the past year. The *Mining Journal* of the 17th inst. says: "In this district, but three of the twenty furnaces are in blast, while a majority of those in Ohio and Pennsylvania, to which our mines mainly look for a market, are also idle. It is true that the production of our mines in the year just closed shows a small increase over 1875, and that the most of the ore mined was sold at a living profit; but whatever of profit was realized was at the expense of labor and the railroad and shipping interest."

Iron Ore.

Name of Mine.	Tons of 2,240 lb	Name of Mine.	Tons of 2,240 lb.	Name of Mine.	Tons of 2,240 lb.
Cleveland	145,661	Lake Angeline	22,539	Excelsior	2,857
Republic	120,094	Salisbury	20,315	Wheeler	2,022
Lake Superior	111,766	Spurr Mountain	20,276	Erie	1,058
Jackson	78,879	Edwards	19,330	Nelson & Curry	732
Michigamme	70,027	McComber	17,276	Grand Central	456
Champion	66,002	Palmer	15,324	Foster	320
New York	59,230	Keystone	7,715	Smith	225
Saginaw	56,979	Cambria	6,329		
Rolling Mill	53,265	Shenango	5,596	Total	968,233
Barnum	37,632	Bessemer	4,779		
Winthrop	27,236	Humboldt	3,333		

Pig Iron.

FROM ESCANABA FURNACES.

	Tons 2,240 lb.
Deer Lake furnace	1,545
Escanaba "	70
Iron Cliffs "	460
Pioneer "	7,380
Total	9,455

FROM GRAND ISLAND FURNACES.

	Tons 2,240 lb.
Bay furnace	8,119
Munising "	2,407
Total	10,526

FROM MARQUETTE FURNACES.

Bancroft furnace	3,282
M. & P. Rolling Mill	10,514
Morgan furnace	3,275
Pioneer "	4,399
Total	21,473

Placing upon the above a fair valuation, say the ore at the mines at $4 per ton, would amount to $3,872,932, and the pig metal at the furnaces at $25 per ton would amount to $1,036,350, showing an aggregate iron product valued at nearly $5,000,000 for the season. The prices of No. 1 hard ore on the docks at Cleveland, Ohio, have ranged as follows during the past four years: 1873, $13@13.50; 1874, $8.50@9; 1875, $7@7.50; 1876, $6.50@7. The above yield shows an increase of over 100,000 tons as compared with the product for 1875. The aggregate production of the district for a period of 22 years, from 1856 to 1876 inclusive amounts to about 9,600,000 tons. The wages of the miners in the district will now probably average about $1.60 per day, and that of laborers $1.50 per day.

NEVADA MINES.

We take the following from the *Gold Hill News*, showing the condition of the Comstock mines up to the 17th inst.:

Consolidated Virginia.—Daily yield, 300 tons of ore. The enlargement of the main drift connecting with the Gould & Curry is fast approaching completion. The main west drift from the C. and C. shaft on the 1,650-feet level is in a distance of 649 feet, the face in more favorable ground. This drift will undoubtedly reach the ore vein in a few more days.

California.—Daily yield, 500 tons of ore. The ore stopes on the 1,400, 1,500, and 1,600-feet levels are all yielding an abundance of good ore, and never had a more promising appearance for the future than at the present time. The main lateral south drift on the 2,600-feet level is steadily advancing, the face still in rich ore. The south drift from the north winze near the dividing line between the California and Consolidated Virginia on the 1,650-feet level is being rapidly pushed ahead, the face also in rich ore. The main west drift from the C. and C. shaft on the 1,650-feet level is in a distance of 649 feet, the face in more favorable ground. The appearances are that it will not take many more days to reach the ore vein with that drift. Sinking the C. and C. shaft is making excellent progress, considering the hardness of the rock encountered and the strong flow of water.

Justice.—Daily yield 340 tons of ore, keeping the mills all running up to their full crushing capacities. The prospecting drifts on the 600 and 800-feet levels are opening up new and more extensive bodies of ore, while the breasts and stopes on the 400, 500 and 700-feet levels continue to afford a steady and uninterrupted yield of good milling ore. The Alta mill is to be added to the crushing force in a very few days. The ore-producing prospects of the mine were never as promising as at this time, or the ore being milled of a better character. The main southeast drift three or four days ago encountered much softer and more favorable ground, with a strong flow of water. The indications are that the ore-vein on that level will soon be reached. The northeast drift on the same level is making good progress, the face in very favorable vein matter.

Overman.—The new pumping engine got fairly at work on the 15th inst, since which time it has done splendid work. It has already drained the water to within a short distance of the bottom of the shaft, and will soon have it dry, and in a condition ready for the resumption of work on the 1,400-feet level. This is a compound, direct-acting engine of 700-horse power, has a 32-inch initial and a 65-inch expansion cylinder, and is one of the most powerful and finest pieces of machinery ever erected on the Comstock. The attachment is direct to the bishop-head of the pump-bob, thus doing away with all the intermediate, old-fashioned double gear. A double-column of 12-inch pumps extend from the surface to the bottom, which is equal in capacity to a single line of 17-inch pumps. Drifting on the 1,300-feet level had to be suspended during the first part of the week, until the pumping engine was gotten well to work. Since the starting of the pumps, work has been resumed again at that station. The main south drift on the 1,250-feet level is steadily advancing, and will connect in a few days with the north drift from the Caledonia Mine, and thus secure a much desired and needed ventilation of the mine down to that level, and prepare the way for cross-cutting the ledge, and sinking prospecting winzes downward on the ore vein.

Ophir.—A few tons of ore are being hoisted daily from the old stopes on the lower levels. This ore is low grade, being but little better than a bare milling value. The prospecting drifts on the 1,600 and 1,700-feet levels are being prosecuted with a greater vigor and more rapid success than at any time in the past two years. Sinking the main incline for the purpose of opening the 1,800-feet station is making the best of progress. It is now down fifty-seven feet below the 1,700 feet level, and at the present rate of progress will reach the 1,800-feet level by the close of the present month. The main north drift, on the 1,700-feet level, is in quartz and low grade ore. An east cross-cut will soon be started on that level.

Chollar-Potosi.—Daily yield 120 tons of ore, the average assay value of which is $29.50 per ton. Sinking the main incline below the 1,700-feet level is making the best of progress. The bottom of the incline is perfectly dry and the rock in the bottom blasts out finely. At the Combination shaft the big pumping engine and pumps are all ready for use when needed. There is no flow of water at the bottom of the shaft, all the water there is being that which seeps down the sides from the soft clay strata encountered near the surface. This is taken up with the loose rock and hoisted by the tanks to the surface.

Imperial Consolidated.—Some little delay was again experienced by a breakage of the pump-rod near the 2,000-feet level during the first part of the week. This breakage in turn has considerably retarded the progress of the work on the 2,000 and 2,135 feet levels. A large water tank has, however, just been completed in which to catch the flow of water at that station. This, taken along with the permanent repairs and improvements being made to the pumping machinery, will, in a very short time, bridge over all these troubles and put everything in better shape for the most thorough prospecting of the lower levels than it has ever been before.

Hale & Norcross.—The water is held in check by the pumps a few feet below the 1,900-feet level, while the connecting drift with the Savage at that station is being repaired and put in working shape. This work is being forwarded with all possible dispatch, as the heat is intense and a better ventilation must be obtained before trying to reach the next level.

Savage.—The water is being held at a point below the 1,900-feet level by the pumps, while every effort is being put forth to repair and put in good working order the connecting drift with the Hale & Norcross Mine at that level. The repairing of this drift and the better ventilation of the mine at that point is a necessity before extracting the water and the repairs to the lower levels can be proceeded with to any advantage whatever.

Belcher.—Daily yield, 130 tons of ore, keeping the Santiago mill steadily running. Sinking the main incline is making good headway. The main south drift on the 1,600-feet level shows no change of value. Sinking the air and drain shaft is also making excellent progress.

Silver City.—Some very good ore is being met with and extracted at the lower level, through the incline. In fact the prospects at this point are even better than the present management expected to meet with.

Sutro Tunnel.—Total length of tunnel 15,627 feet. Face in hard ledge porphyry, with streaks of quartz and clay.

CALIFORNIA GOLD AND SILVER MINING COMPANY (ANNUAL REPORT.)—The annual meeting of this company was held on the 17th inst. The mine has yielded during the year ending December 31, 1876, 128,800 tons and 1,500 pounds of ore. Of this ore 127,510 tons and 1,200 pounds have been reduced, leaving on hand in the ore houses and at the mills 1,260 tons 300 pounds, of the value by assay of $189,000. The ore reduced has yielded bullion to the value of $13,400,841.40, being 73⅜ per cent. of the assay value of the ore. The value of the gold in this bullion is $6,488,640.58, and that of the silver $6,912 200.82 The average yield of the ore per ton is $105.07. No work has been done during the year on the 1,300-feet level. In the 1,400-feet level the drift has been connected with the Ophir, securing ventilation. No ore of value has been found in the northern 250 feet of this drift. In the crosscuts and winzes there is good, valuable ore. The body of ore is on all sides, above and below. On the 1,500-feet level the full extent of ore is unknown. The northern and southern portions, except a few feet at the north end, show large bodies of ore of great value. The time for convenient and advantageous working of the lower levels will come when the drift, which is now being run from the California and Consolidated Virginia shaft on the 1,650-feet level, has reached the ore body. This drift is now in 610 feet from that shaft, and will undoubtedly reach the vein some time during the present month. Connection will then be made from this drift with the deep winzes, which will give new facilities for extracting ore from these lower levels, and at the same time will create additional ventilation for the mine. This drift would have been into the ledge five months ago had it not been for the great influx of water in the Consolidated and California shaft, which has prolonged the sinking of the shaft and delayed the running of the drift and the opening and working of the lower levels. The Secretary's report shows cash and bullion on hand, $1,344,406.57, from which is is to be deducted the dividend paid on the 11th inst., the report being made up to the 13th inst. The receipts show an overdraft on the Nevada Bank of $339,637.62. The gross product of the mine is given as $13,400,841.40. The President's report is brief and contains no items of interest.—*San Francisco Stock Exchange.*

NOTES.

PHOSPHOR BRONZE WINDING ROPES.—M. J. Manne, the manager of the Phosphor Bronze Works, at Val-Benoit, Liége, exhibited a winding rope made entirely of this alloy. Phosphor bronze ropes have the advantages of offering great resistance to strains of traction, of being very pliable and inoxidisable, and of resisting any attack of corrosive water, while the wear due to the contact of the wires is less than in other metallic ropes; they also preserve their pliability after wear. These phosphor-bronze ropes are used in Belgium, at the Bois-du-Luc, Horloz and Courcelles-Nord collieries among others.

GOLD MINING IN TASMANIA.—The now celebrated New Native Youth Gold Mining Company, at the Nine Mile Springs, promises to turn out a perfect Golconda. The total value of gold got out of this wonderfully prolific claim since the beginning of the year now amounts to nearly £40,000, and the mine now looks richer than ever. The gold obained from a six weeks' crushing of 1017 tons of quartz amounted to 2374 oz., and its money value £9734. The amalgam obtained from the boxes was 4918 oz., from the plates 1392 oz.: total, 6310 oz., which yielded 2374 oz. retorted gold, showing an average yield per ton of 2 oz. 6¼ dwts.

AMBER IN THE BALTIC SEA.—Reboux states that at the eocene epoch the bed of the Baltic sea was occupied by an immense forest, which spread over nearly the whole northern continent. Dredging carried on at a depth of 6·4ft. below the sea bottom has brought to light thereby two species of conifers, a poplar, a chestnut, and various other trees. From the conifers, the author thinks, ran the resin which, through being buried in the earth, has become changed into amber. The largest quantity of the gum appears to have been derived from the *pinus succinus*. More than 200 specimens of objects have been found imbedded in the gum, including insects, reptiles, plants, leaves, grains, shells, fruit, &c. The density of natural amber varies from 1·09 to 1·11. Its analysis, according to Schrotter, is: Carbon, 78·82; hydrogen, 10·23; oxygen, 10·90.—*The Engineer.*

PHOSPHOR BRONZE, TIN, ZINC, &c.—Dr. Stammer has been examining phosphor bronze with the following result:—The addition of phosphorus reduces the oxides present in the metals, renders the tin crystalline and the alloy more homogeneous, and increases the hardness without diminishing the tenacity. Phosphorus copper may be made by heating together four parts acid calcium phosphate, two of granulated copper, and one part of charcoal; the copper must be pure. Phosphorus tin, by heating six parts phosphorus with ninety-four parts moist tin sponge prepared from the chloride by reduction with zinc; the substance formed is Sn_9P, fusible at 370 deg. The phosphorus bronze is made by fusing phosphorus tin with copper or with phosphorus copper. It fuses at 1230 deg. to 1250 deg.; the finish product usually contains 0·053 to 0·76 per cent. phosphorus and 4 to 9 per cent. tin. The advantages of phosphorus bronze are set forth in detail in Dr. Stammer's paper.—*The Engineer.*

CARBONIC ACID AS A MOTIVE POWER.—Herr Beins, of Gronnigen, Holland, is of opinion that carbonic acid—which he terms carboleum—will be the long-looked-for successor of steam as a motive power. He has shown that, when sodium bi-carbonate is heated in a confined space, a portion of its carbonic acid is liberated, under any degree of tension; so that, for example, by heating the bi-carbonate to about 200 or 300 deg.—about 400 to 575 deg. Fah.—liquid carbonic acid is obtained under a pressure of from 50 to 60 atmospheres—750 lb. to 900 lb. If a more moderate pressure is wished, it is only necessary to moderate the amount of heat applied, so that it is quite within the power of the operator to store up the acid at any desired pressure. The observations of Herr Beins are practical enough to warrant the attention of those who are interested in the matters he discusses. He certainly indicates a cheap and practical method of generating a prodigious amount of energy, the utilization of which is attended with even less difficulties than steam.—*The Engineer.*

SOUTH AFRICAN DIAMOND MINES.—Owing to the depreciation in price to the extent of some 30 per cent. of the inferior descriptions of diamonds which constitute some 99 per cent. of the total production of stones, a complete collapse had occurred in the diamond-digging industry. Wages for mechanics, such as carpenters, blacksmiths, &c., which had been as high in some cases as £9 to £10 per week, had fallen to less than half that amount, and crowds of artisans were leaving Kimberley, where the principal diamond mine is situated, for Cape Town and Port Elizabeth. Diamond "claims," 30 feet x 30 feet, which had recently found a ready sale, where first-class, at £4,000 to £5,000 each, were practically unsalable, except at a heavy loss to the owners. The banks—Standard, Oriental, and Cape of Good Hope—being extensive holders of liens on such property, and having made large advances on diamond shipments to Europe, were acting with extreme caution in order to avoid a general crisis, the effects of which would be most disastrous to the general community; but forbearance was happily the order of the day.—*Sydney Herald*, Nov. 1st 1876.

ZINC WHITE VS. WHITE LEAD.—Fredk. S. Braff, Professor of Chemistry at the Royal Academy of Arts, writes to the *Ironmonger* as follows: "Sooner or later, white lead must be given up as a pigment; from its power of saponifying with oil, involving the loss of carbonic acid, it loses its opacity, and turns yellowish. It is valued for what is termed its body, and from the ease with which it is laid on. In my lectures for several years past at the Royal Academy of Arts, I have pointed out its defects, with, I am glad to say, some success, and many artists are now using zinc white, which retains its opacity, and does not blacken on exposure to foul air. For artistic purposes zinc white can be prepared nearly equal in body to white lead. For more than a year I have been working on zinc pigments, with a view to their being used in lieu of white lead in house painting, and I feel convinced, from the result of my experiments, that sulphide of zinc, properly prepared, can be made to have as good covering properties as white lead, and that the addition of magnesia in the manufacture renders it as agreeable to work. I wish, therefore, to call the attention of those interested in this question to the fact that they can obtain a better paint in all respects than white lead, and one which has no injurious effects on the health of those who prepare or use it."

IMPORT STATISTICS.—Washington, January 25.—The following statement showing the exports of the principal articles of British and Irish iron and metal manufactures from Great Britain to the United States during the year ended December 31, 1876, compared with the corresponding period of 1875, has been furnished by the chief of the Bureau of Statistics:

Commodities.	Year ended Dec. 31. 1875.	1876.
Copper, unwrought, cwts.	20	30
Copper, wrought, cwts.	271	329
Hardware and cutlery	£552,501	£350,930
Iron, pig, tons	51,362	41,113
Iron, bar, etc., tons	3,204	2,572
Iron, RR., all kind, tons	17,790	372
Iron, hoop, sheet, etc. tons	11,025	7,015
Iron, tin plates	95,995	93,232
Iron, cast or wrought, tons	7,816	4,179

Commodities.	Year ended Dec. 31. 1875.	1876.
Iron, old, for remanufacture, tons	8,181	5,634
Iron, steel, unwrought, tons	10,681	7,465
Lead, rolled, pig, sheet, etc., tons	285	1,315
Machinery	£185,377	£215,819
Salt, rock and white, tons	220,296	218,828
Tin, unwrought	£16,570	£14,245

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Jan. 20.

Tons of 2,240 lb.	1877. Week.	1877. Year.*	1876. Week.	1876. Year.*
Wyoming Region.				
D. and H. Canal Co.	33,319	90,124	48,344	88,675
D. L. and W. RR. Co.	34,315	99,812	38,930	112,769
Penn. Coal Co	12,800	42,011	24,830	66,131
L. V. RR. Co	22,584	52,189	23,737	65,004
P. and N. Y. RR. Co.	90	1,151	757	2,152
C. RR. of N. J.	26,447	74,335	23,715	55,399
	129,621	359,622	160,309	390,670
Lehigh Region.				
L. V. RR. Co	41,767	95,288	34,047	100,007
C. RR. of N. J.	17,038	25,389	27,000	74,083
D. H. and W. B. RR.	—	—	—	—
	58,805	120,677	62,547	174,780
Schuylkill Region.				
P. and R. R. RR. Co.	78,601	188,998	48,935	67,550
Shamokin & Lykens Va.	8,059	24,226	2,031	10,444
	86,750	213,224	50,966	78,093
Sullivan Region.				
Sul. and Erie RR. Co.	251	732	1,282	2,349
Total	275,427	694,255	275,104	646,402
Increase	323	47,853	—	—
Decrease	—	—	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 22,802 tons, as compared with the corresponding period in 1876.

Belvidere Delaware RR. report.	Week.	Year 1877.	Year 1876.
Receipts of coal at Coal Port (Trenton)	—	—	—
" " " South Amboy	9,460	16,365	48,457
Shipments at Coal Port (Trenton)	—	—	—
" South Amboy	8,307	20,491	22,739

Perth Amboy business:

	Tons.
Received for the week	25,825
Shipped for the week	11,708
On hand Jan. 20	125,462

Receipts of Coal at Boston, for the week ending Jan. 19, and years from Jan. 1, 1876 and 1877.

From	Week. Tons.	Previously. 1877. Tons.	1876. Tons.
Alexandria and Georgetown	—	—	2,150
Philadelphia	4,500	4,420	10,200
Baltimore	—	2,440	4,002
Other places	660	2,008	11,472
Great Britain	—	610	525
Nova Scotia	—	—	—

The Production of Bituminous Coal for the week ending Jan. 20 was as follows:

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week. Tons.	Year. Tons.
Tons of 2,240 lb.	7,488	29,392
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb.	7,244	20,709
Broad Top Region, Pa.		
Huntingdon and Broad Top RR.	2,572	6,813
*East Broad Top	105	65,999
Clearfield Region, Pa.		
*Snow Shoe	483	51,320
*Tyrone and Clearfield	6,102	1,192,418
Allegheny Region, Pa.		
*Pennsylvania RR.	1,064	210,315
Pittsburgh Region, Pa.		
*West Penn. RR.	2,068	203,354
*Southwest Penn. RR.	398	57,109
*Penn. & Westmoreland gas coal, Pa. RR.	5,549	806,810
*Pennsylvania RR.	1,905	309,840

* For two days ending Dec. 30.

The Production of Coke for two days ending Dec. 30.

Tons of 2000 lb.	Week.	Year.
West Penn. RR.	1,731	57,708
Southwest Penn. RR.	4,745	539,630
Penn. & Westmoreland Region, Penn. RR.	632	60,465
Pittsburgh, Penn. RR.	1,432	162,132
Total	8,060	820,025

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Jan. 26, 1877.

Anthracite.

We last week called attention to some alarming features in the anthracite trade, and events are rapidly justifying our forebodings. The outlook is exceedingly discouraging, and the air is full of rumors of financial embarrassments which are rapidly drifting one or two of the companies into the whirlpool of a receivership. This step seems to be imminent in at least one case, and the anticipation of a fierce business war, which it is supposed to foreshadow, has created a well-founded distrust of the future stability of the companies not now in immediate danger.

The prices at which coal was sold, even under the most careful nursing, at the auction sales this week, and the fact that it can be obtained at these or lower prices at private sale to-day, and that season contracts are being made at unprecedentedly low prices, are unmistakable indications of pressing financial necessities, and of the warmest kind of competition in the future. These prices are scarcely sufficient to cover actual cost of mining and placing in market in even favorable cases, and will certainly result in loss in others, while they give no promise of ability to meet the heavy interest and rental accounts which are millstones hanging round the necks of most of the companies. Is it necessary to say more in order to show the alarming condition of the case, or to go into figures to show the effect on the other companies of the appointment of a receiver in the case of one or two?

The Philadelphia and Reading Company is effecting great economies in its administration. Only so many of its collieries as are capable of supplying the demand when running full are kept at work, and the more expensive mines are temporarily abandoned. Dead-work is kept up at the several collieries to the full requirements of the future, and everything done with the view of low future cost of production. If this company were relieved of its large interest account it could send coal to market at surprisingly low figures, and its intention of doing a large business is very evident.

The decks are being generally cleared, and everythin points to a lively time in the anthracite trade in the near future.

The Pennsylvania Coal Company had advertised to sell at auction on the 24th inst. 100,000 tons of coal, but previous to any portion of this amount being offered 50,000 tons were withdrawn on the plea of a plane house on the company's gravity road having been burned, which caused a delay in transportation. But very little of the coal offered went into the hands of consumers or retail dealers.

The following quantities were sold at the accompanying prices, which we compare with those of the previous sale by the same company:

Tons.	Jan. 24, 1877.	Dec. 20, 1876.
7,700 Steamer	$2 82½	$2 82½
14,300 Grate	2 82½	2 82½
7,000 Egg	2 88½	2 82½
25,000 Stove	3 45	3 44

The Delaware, Lackawanna and Western Railroad Company sold on the same day, one hour later, 100,000 tons as follows (we compare the prices received with the average of those of its sale Dec. 21, 1876):

Tons.	Jan. 24, 1877.	Dec. 21, 1876
10,000 Steamer	$2 65	$2 85¾
20,000 Broken	2 67	2 82½
15,000 Egg	2 82½	2 90½
40,000 Stove	3 46½	3 65¼
15,000 Chestnut	3 05¾	3 20¾

It will be observed that there were declines ranging from 20¾c. to 8c. per ton in the prices of all sizes.

Upon the same day the Delaware and Hudson Canal

Company announced the following prices f.o.b. Weehawken:

Furnace lump	$2 75
Steamer "	2 75
Grate	2 75
Egg	2 90
Stove	3 60
Chestnut	3 35

These prices, as compared with the average prices received by the Delaware, Lackawanna and Western Railroad Company at its auction sale, are 10c. higher on steamer, 8c. on grate, 7½c. on egg, 13½c. on stove, and 29¼c. on chestnut, while, as compared with the Pennsylvania Coal Company's sale, they are in some cases lower. As compared with its own circular prices for the earlier portion of this month there are reductions ranging from 10c. to 45c. So far as we have heard from the other companies their prices will be upon the same basis as those of the Delaware and Hudson Canal Company.

In addition to the coal sold at auction there was a considerable quantity sold previously by other companies at rates to be based upon those secured at the public sales.

It is very difficult to arrive at the prices being actually realized for coal. It is certainly being sold as low as the average of the auction sales, while it is said that even lower prices are named. The demand is light and stocks are accumulating. Though present prices are manifestly unprofitable, we should not be greatly surprised to see in the future even lower rates than these.

Shipments continue to be interfered with by the accumulation of ice in the harbors.

The production last week was but 323 tons in excess of the corresponding week of 1876. The increase since January 1st, as compared with the like period of last year, is 47,853 tons. The Philadelphia and Reading Railroad Company shows an increased production of about 140,000 tons since January 1, as compared with corresponding three weeks in 1876. As a large part of this increase has come to the New York market, it has in the present unsettled state of trade a very demoralizing influence.

Bituminous.

The business in this article continues to be seriously curtailed, owing to the inability of the companies to make shipments from any other port than South Amboy. Since the ice blockade the Pennsylvania Railroad Company has been allowing a drawback on coal shipped from South Amboy destined to Eastern ports. It is more than intimated that some company or companies are consigning their coal to the East and stopping vessels so consigned at this city, taking advantage of the drawback to enable them to undersell their neighbors.

It would be well for the bituminous companies and miners to carefully study the present and prospective condition of the anthracite trade and note the remarkably low prices ruling. Even their strongest arguments will scarcely suffice to offset the vast difference in cost that exists between the two descriptions of coal. From the present outlook this difference can only be diminished by a reduced cost of mining and transportation on bituminous coal, as all the indications point to a very low range of prices for anthracite during this year. The Cumberland companies may as well prepare for this new order of things, and miners must recognize the fact that a very large reduction in wages, even from the 50 cent basis, is inevitable. The urgent need of a new outlet from this field is more and more apparent, and it becomes of as much interest to the miners as to the mining companies to secure it.

The Cumberland *News* says: "The wages question has not reached a solution yet. At present there are three rates paid in the region, viz: By the Consolidation, 50 cents; by the Hampshire and Baltimore, 55 cents; by the George's Creek, Maryland, Atlantic and others, 65 cents. The miners of the New Central are still considering Mr. Sinclair's offer of work at 50 cents, which he renewed to them on Saturday. The Hampshire and Baltimore have gone to work at 55. Otherwise than we have noted, the situation remains unchanged."

The shipments of Cumberland Coal for the first three weeks of this year show a falling off of 22,802 tons as compared with the corresponding weeks of last year. The Clearfield shipments for 1876, which is the last report we have to hand, were 1,190,418 net tons, as against 915,288 tons for 1875, showing an increase in 1876 of 275,130 tons, or 30 per cent., an increase equalled only by that of the Kanawha coal on the line of the Chesapeake and Ohio Railroad.

New York.

Wholesale Prices of Anthracite Coal f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	2 75	2 75	2 75	2 90	3 60	3 55
Pittston at Weehawken	3 00	3 00	3 00	3 10	3 60	3 35
Wilkesbarre at Port Johnston	3 00	3 00	3 00	3 00	3 75	3 25
Plymouth, R. A.	....	....	3 00	3 00	3 85	3 35
Susque. Coal Co. at Amboy W.A.	3 00	3 00	3 00	3 00	3 75	3 25
Kingston at Hoboken	3 00	3 00	3 00	3 00	3 75	3 25
Lehigh Coals.						
Old Company at Port Johnston	3 75	....	3 25	3 25	3 75	3 25
Old Company's Room Run "	3 75	....	3 25	3 25	3 75	3 25
Sugar Loaf, Hobok. & Amb. "	3 75	....	3 25	3 25	3 75	3 50
Lehigh Coal Exchange "	3 75	....	3 25	3 25	3 75	3 50
Honey Brook Lehigh	2 75	....	3 25	3 25	3 75	3 25
Beaver Meadow at South Amboy	3 75	....	3 25	3 25	3 75	3 25
Mount Pleasant at Hoboken	3 50	....	3 15	3 15	3 50	3 30
Schuylkill Coals at South Amboy.						
Schuylkill white ash	2 75	2 75	2 75	2 90	3 60	3 25
Schuylkill red ash	....	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	....	....	....	....
North Franklin red ash	....	....	....	....	....	....

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

	Per ton.
Freight from Hoboken and Weehawken to New York	.35@40c.
" " Elizabethport & Port Johnston to N. Y.	.35@40c.
" " South Amboy to New York	.35@40c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt.	4 25	5 65
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	6 00	7 00
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va.	3 50@3 75	5 20
Cumberland, at Baltimore	3 65@3 80	5 00
Clearfield f.o.b. Canton, Baltimore	3 40@....	5 45

Pennsylvania Semi-Bituminous Coals

At the mines, per 2,000 lb., 90c. f.o.b. at Greenwich, Phila., for Eastern and foreign shipments, per 2240 lb. $3 25@3 35 for Sound ports, 3 50@3 65, f.o.b., at South Amboy, N. J., per 2,240 lb., $4 10@4 60. Discharged, in New York, per 2,240 lb., $5 00 @5 20.

Foreign Gas Coals.

	Sterling.	Am. currency.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	2 00	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove. Chestnut.
Pittston coal, in yard	$3 90	$4 20 $3 90
Lackawanna coal, in yard	3 90	4 20 3 90
Wilkes-Barre, delivered	5 00	5 30 4 60
Lehigh & Locust Mountain, del'd.	5 50	5 50 5 00
Schuylkill Red Ash, del'd	5 25	5 50 4 75

The Cost of delivery for Pittston and Lackawanna coal ranges from 4c cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " "	18 00
American " " "	11 00
Cannelton Block, or splint, " " "	10 00
American Orrel " " "	11@14
Red Bank Cannel " " "	10 00
Cumberland " " "	7 00

Baltimore, Md. Jan. 24, 1877.

Specially Reported by MESSRS. E. STABLER & CO.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Boston" Vein, and Plymouth White Ash.

In cars at depot.		In cars at depot.	
Lump	$3 85	Egg	$4 10
Steamboat	4 10	Stove	4 60
Broken	4 10	Nut	4 10

Shamokin, red or white ash.

Egg	4 30	Stove	4 60

Lykens Valley, red ash,

Egg and stove 5 35

From wharf or yard, wholesale, 50@75c. additional.

By retail, all kinds and sizes, per 2240 lb. $5 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point 3 75@4 00

West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point	4 50
Swanton	4 00

Boston, Mass. Jan. 20, 1877.

Coal is in good retail demand, but though receipts have almost come to a standstill on account of the ice, prices are not particularly strong. Freights are nominal.—*Commercial Bulletin.*

Buffalo, N. Y. Jan. 24, 1877.

Specially Reported by Messrs. LEE & LOOMIS.

Deliv'red at	Elmira. Afloat.	Ithaca. Afloat.	Syracuse Afloat.	Rochester. Afloat.	Rochester. ret. del.	Oswego f.o.b.
Grate	$4 20	$3 45	$3 60	$4 30	$5 55	$4 55
Egg	4 20	3 55	3 70	4 40	5 65	4 65
Stove	4 60	4 05	4 20	4 90	6 15	5 15
Nut	4 60	4 05	4 20	4 90	6 15	5 15

Delivered at	Erie. f.o.b.	Buffalo. Afloat.	Buffalo. f.o.b.	Buffalo. ret. del.
Grate	$5 05	$4 55	$5 05	$5 80
Egg	5 15	4 65	5 15	5 90
Stove	5 65	5 15	5 65	6 40
Nut	5 65	5 15	5 65	6 40

Chicago, Ill. Jan. 24, 1877.

Specially reported by Messrs. RENO & LITTLE.

Lackawanna Stove	$8 00	Erie and Brier Hill	$6 00
" Chestnut	7 75	Wilmington & Ill.	3 50@4 25
" Grate & Egg	7 50	Blossburgh	7 00

Indianapolis, Ind. Jan. 23, 1877.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 75	Peytona cannel, per ton	$5 75
Brazil Block, "	2 75	Indiana Cannel	4 50
Highland, grate, "	2 50	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$6 70	Nut	$6 70
Egg	6 70	Stove	6 70

Lehigh Anthracite.

Broken	$7 60	Nut	$7 30
Egg	7 60	Stove	7 70

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	8c.
White River	13	" Slack, "	7
Brazil Block	13	Peytona Cannel	—
Highland grate	12	Virginia "	27
Block Nut, domestic use	11	Youghiogheny	16
Highland Nut, " "	11	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	14c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$7 50 per ton.
Lehigh, retail	8 50 per ton.

Cincinnati, O. Jan. 23, 1877.

Specially Reported by Messrs. A. BUCHANAN & CO.

On account of the river being closed at this point there is no coal being sold at wholesale. There is no Kanawha coal in the market.

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	@7c.	—
Pomeroy coal	@5c.	—
Kanawha "	7½c.	—
Ohio River Coal	5⅜c.	—
Cannel coal, according to quality	@16c.	—

The following are the retail prices delivered

Youghiogheny	—	$3 00
Pomeroy	8 —	2 50
Cannel	f @22c.	—
Kanawha	10c.	—
Anthracite, per ton		@$9 50
Coke, at yard	10c.	—
Coke, hard and soft, delivered	— @9c.	—

Cleveland, O. Jan. 23, 1877.

Specially reported by Messrs. LAMBIE & BATES.

The following are the prices established by the Coal Exchange until further notice:

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	1 to 10 tons unw'd.	10 tons upw'd.
Brier Hill lump.	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 75
" " " " nut	3 75	3 50
Straitsville Lower Vein, Hocking & Shawnee, P'p.	3 00	3 25
" " " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.

All sales to be strictly cash with order or C. O. D.

Louisville, Ky. Jan. 23, 1877.

Specially reported by Messrs. BYRNE & SPEED.

WHOLESALE.

	per bushel		per bushel
Pittsburg	6½c.	Pine Hill	—
Raymond City	6½c.	Kentucky	7c.

RETAIL.

	per bushel		per bushel
Pittsburgh	10c.	Peytona Cannel	18c.
Raymond City	10c.	Buckeye "	
Pine Hill	13c.	City-made Coke	8c.
Kentucky	9c.	Anth., per ton, $10 00 to 10 50	
Screened Pittsburgh per load		$3 50	
Screened Raymond City		2 50	
Pine Hill (Kentucky)		2 25	
Cannel		4 50	
City-made Coke		4 00	

Milwaukee, Wis. Jan. 23, 1877.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2000 lb.

Lehigh Lump	$ 8 00	Briar Hill, select	$7 00
Lehigh Prepared	9 00	Blossburgh	7 00
Lackawanna (all sizes)	8 00	Cannel	6 00
Pittston	8 00	Pittsburgh	6 50
Scranton	8 00	Oak Hill	6 00
		Steam coal	4@5 00

New Orleans, La. Jan 22, 1876.

Specially Reported by Messrs. C. A. MILTENBERGER & Co.

Pittsburg coal, wholesale, by boat-load, per bbl	50c
" steamboats, per bbl	60c.
" to manufacturers, per bbl	65c.
" to families	75c.
" shipments, per hhd	$6 50
Anthracite, wholesale, per ton	7@8 00
" retail, "	11 00
Virginia Cannel, retail, per bbl	1 25
Scotch " "	....
Mt. Carbon, wholesale, per bbl	...
" " retail, "	....
St. Bernard wholesale, per bbl	—c.
" steamboat	5cc.
" retail "	70c.

Philadelphia, Pa. Jan. 25, 1876.

From our Special Correspondent.

Nothwithstanding the cold weather the coal trade is quite dull, and the opening of navigation is again thrown back. $3 is asked for freight to Boston, but there are no charters. The trade is anxiously waiting for the programme of this year; the low prices at auction yesterday, and the rates at which coal is already offered for season contracts being the lowest ever known in the trade.

Pittston, Pa. Jan. 23, 1877.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional.

Richmond, Va. Jan. 23, 1877

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous	$4 40
Coalburgh Splint	5 70	Clover Hill Coal	3 50
Lewiston "	5 70	James River Bitum	3 30
Kanawha Gas coal	4 90	" " Carbonite	5 00

St. Louis, Mo. Jan. 23, 1877.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE.			per ton.
Lackawanna	$9 00@10 00	Schuylkill	9 00@10 00
Wilkes-Barre	9 00@10 00	Lehigh	10 00@10 50
BITUMINOUS.			
Blossburg	9 00	Big Meadow	3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connellsville Coke	3 50

Toledo, Ohio. Jan. 23, 1877.

Specially reported by Messrs. GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Ton of 2,000 lb.

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut	6 75	" chestnut	7 75
Soft Coal.			
Hocking lump	4 00	Brier Hill	5 75
" nut	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Rates of Transportation on Anthracite Coal to Tide Ports.

PHILADELPHIA AND READING RAILROAD CO.
General Office, 227 South Fourth Street.
PHILADELPHIA, Dec. 18, 1876.

From and after this date, and until further notice, shipments of anthracite coal can be made through by rail to South Amboy, via Richmond Junction, at the following rates, per ton of 2,240 pounds, in company's car:

From Schuylkill Haven	$1 52
" Tamaqua	1 67
" Pine Grove	1 72
" Port Richmond	65

An additional charge of twenty-five cents per ton will be made on chestnut and pea coal, unless the shipper signs the usual release.

The release now in force will apply to this trade.

(By order of the Board of Managers),
DAVID BROWN, Secretary.

Lehigh and Wyoming Coals.

per ton of 2240 lb.

To	From Penn Haven.	From Mauch Chunk.	From Hazleton*	From Upper Lehigh.	From Ashley and Sugar Notch.
‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	1 62	1 48	2 04	1 95	2 18
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	....	58	49	72
‡ Philipsburg, N. J., (46 miles)	60	46	1 00	9	1 14
Elizabethp't, (114 m) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 26	1 12	1 68	1 59	1 82
High Bridge, N. J.	1 95	1 75	2 43	2 34	2 52
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	1 89	1 75	2 31	2 22	2 45
Jersey City, N. J., (121 miles) and New York, via L. V. RR	1 59	1 47	2 01	1 92	2 15

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR. $1 47

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR. 1 25

For way points between *Mauch Chunk* and *Philipsburg*, on the New Jersey Railroads 1 00

From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware, Lackawanna and Western RR., Morris and Essex Division 65

From *Phillipsburg, N. J.*, to *Newark* (75 m.) via Delaware, Lackawanna and Western RR. 1 01

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

† Transportation on Coal destined for re-shipment from this point from boat to boat is 20c. less, if discharged upon the wharf 10c. less than the above rate.

The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

Geneva, Ithaca and Sayre Railroad.—The rates of transportation on coal from Coxton, Pa., per ton of 2,240 lb., from and after the first of November will be as follows:

To East Waverly, N. Y.	$1 75
" Ithaca, and for C. Lake RR. (local)	1 64
" " for C. Lake RR., and via Erie Canal (shipment)	1 57
" To Van Etten, for U. I and E. RR.	1 61
"Geneva (local) for S. P. and S. and L. O. S. Railroads, and for N. Y. C. and H. R. RR., except Auburn and Cayuga	2 06
To Geneva, for Buffalo and Towanda	1 87
" " " Rochester and Charlotte	2 01
" " " Auburn and Cayuga	2 50
Total rate to Buffalo	3 11
" " " Rochester	2 78

REGULATIONS.

A charge of fifteen cents per ton will be collected of each consignee on all coal not unloaded within twenty-four hours after its arrival, and an additional charge of ten cents per ton for every twenty-four thereafter; Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of broken doors or other defects existing when the cars are loaded.

Seventeen cents per ton will be charged, at Ithaca Docks, for shipping Coal direct from cars to vessels, and 12 cents per ton additional from stock, making a total charge on what is shipped from stock of 29 cents per ton.

All freights will be collected weekly, by drafts on shippers, from Coxton to destination.

Freights on Bituminous Coal and Coke over the Chesapeake and Ohio Railroad.

To	From New River District, say, at Quinnemont. Bituminous Coal and Coke. Distances.*	Regular Rate.	Special Rate.	Coal Screenings Rate.
	Miles.			
Charleston	75	1 00	70	50
Huntington	127	1 20	80	60
Staunton	158	2 30	2 00	1 50
Charlottesville	197	2 80	2 50	2 00
Gordonsville	218	3 00	2 70	2 40
Hanover Junction	276	3 25	3 10	2 50
Richmond	294	3 25	3 10	2 50
Richmond *via* Hanover Junction	....	3 50	3 35	2 75
James River	297	3 25	3 00	2 50

To	From Kanawha District, say, at Blacksburg. Bit. Coal and Coke. Regular Rate.	Special Rate.	Cannel Coal. Regular Rate.	Special Rate.	Coal Screening Rate.
Charleston	80	50	1 20	80	40
Huntington	1 00	60	1 50	1 00	50
Staunton	3 00	2 50	4 00	3 50	2 00
Charlottesville	3 30	2 80	4 25	3 70	2 30
Gordonsville	3 35	2 90	4 40	3 90	2 40
Hanover Junc.	3 40	3 10	4 50	4 10	2 50
Richmond	3 40	3 10	4 50	4 10	2 50
Richmond, *via* Hanover Junc	3 65	3 35	4 75	4 25	2 75
James River	3 40*	3 10	4 50	4 00	2 40

*Except splint coal for domestic use, upon which rate to James River for shipment North and East is same as on Cannel.

A Terminal charge of ten cents per ton, in addition to rates above, will be collected on all coal and coke at James River. Also, at Huntington, a charge of five cents per ton for transferring by tipple, or ten cents per ton for transfer from car to barge on the river track.

This Tariff supersedes all *Special Rates* on coal and coke to any station, except existing special rates to iron furnaces.

Local Tariff No. 7 will govern rates to all stations, excepting as modified by this special tariff but the rate to any station between the stations above designated, shall in no case exceed the rates named herein to the first point beyond it, of the stations above named.

Special Rates.—The rates given above in columns headed "Special Rates," will apply on all shipments of coal or coke mined or made on the line of this road, destined for use in steam or manufacturing purposes; also on all shipments destined for any point off the line of the Chesapeake and Ohio Railroad.

Agents, when they cannot be certain that shipments are destined for use in steam or manufacturing purposes, will collect freight at regular rates as above, and overcharges, if any occur, will be promptly refunded through the General Freight Office.

A charge of twenty-five cents per ton, in addition to all rates herein given, will be made for delivery of coal or coke at points *between stations* requiring the use of an engine.

Coal Screenings.—By "Coal Screenings" is meant dust, nut and fine coal that will pass through a screen of one and a half inch meshes, and will only be taken at the Company's convenience.

* These distances are computed from Quinnemont (or the New River District.) Blacksburg (or the Kanawha District) lies 56 miles west of Quinnemont, which distance will be added to all coal going east of the New River District and deducted from Huntington and Charleston, which lie west of the same.

☞ Sales of coal are made through the General Coal Agency of the C. & O. RR. Company for shipment from James River, North and East, on a basis of pro-rating nett proceeds between the railroad and the mines instead of on fixed rates of freight.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Jan. 26, 1877.

American Pig.—The Thomas Iron Company reports sales of 15,000 tons of iron at $20 for No 1 foudry, $19 for No. 2 foundry and $18 for forge. These prices continue to be the company's quotations for round lots, while for lots of 100 tons $1 extra is demanded. It is reported that the Allentown Iron Company has sold 5,000 tons of No. 1 for delivery in Boston at a price equivalent to even less than $20 at Hoboken. There are rumors of sales by other companies but we are unable to veryify them. It is evident that the present prices are satisfactory to some of the companies, as we hear that some additional furnaces are to be put in blast. We had for some time anticipated that the large sales which usually take place about this time of the year would be made on the basis of $20 for No. 1 iron. With some of the companies well sold ahead an effort may be made to advance prices somewhat, but we do not think that the advance, if made, can be sustained for any great length of time.

Scotch Pig.—But very little business is being done in this article, and but little iron arriving. We quote Coltness at $28.50; Glengarnock, $27; and Eglinton, $25.50@$26.

Rails.—We only learn of a sale of 1,500 tons of steel, delivery from Jersey City. We quote iron rails at mills at $34@$36, and steel at $48@$54.

Old Rails are quiet and quoted at $19@$20.

Scrap.—We are reported a sale of 300 tons of scrap at $26.50, and quote at $26@$27.

Baltimore, Md. Jan. 24, 1877.

Specially reported by Messrs. R. C. HOFFMAN & Co.

We have no change from last report in our iron market, and quote:

Baltimore Charcoal	$29@32	Mottled and White	16@17 00
Virginia Charcoal	28@32	Charcoal C. B. Blooms	60@62 50
Anthracite No. 1	22@23	" " Belletts	65@67 50
" No. 2	20@21	Refined Blooms	50@55 00
Anthracite No. 3	$19@20 00		

Buffalo, N. Y. Jan. 22, 1877.

Specially reported by Messrs. PALEN & BURNS, 246 Washington Street.

Prices per GROSS ton at Furnaces.

ANTHRACITE.

No 1 Foundry	$22 00.—4 mos.
B 1 "	21 50.—4 "
No 2 "	21 00.—4 "
Gray Forge	20 00.—4 "

LAKE SUPERIOR CHARCOAL IRONS.

No. 1	$24 50.—4 mos.
No. 2	23 50.—4 "
No 3	23 00.—4 "
No. 4	23 00.—4 "
No. 5	23 00.—4 "
No. 6	24 00.—4 "

AMERICAN SCOTCH.

No. 1	$23 50.—4 mos.
B 1	22 00.—4 "
No. 2	21 00.—4 "

Chattanooga, Tenn. Jan. 23, 1877.

Specially reported by J. F. JAMES, pig iron broker, etc., 233 Market Street.

Prices remain unchanged.

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$20@ 21
" " " " No. 2 foundry	18@ 19
" " " " gray forge	16@ 17
" and Georgia coke, No. 1 foundry	18@ 19
" " " No. 2 foundry	17@ 18
" " gray forge	15@ 16
White and Mottled	14@ 15
Tennessee and Georgia cold-blast car wheel	21@ 25
" " gray forge	16@ 18
Old Rails	cash 19@ 20
Cast Scrap	" 10
Wrought Scrap, No. 1	" 18@ —
" " " 2	" 12@ —

Cincinnati, Ohio. Jan. 23, 1877.

Specially reported by Messrs. TRABER & AUBERT, commission merchants for the sale of pig iron, blooms, ore, etc.

Consumers generally are anxious to make contracts for future deliveries at present prices. We quote:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00—4 mos
" " No 2, "	23 00@ ....—4 mos
" " Mill	22 00@ ....—4 mos
" " Soft Silver Gray	21 00@22 00—4 mos
Tennessee, No. 1, Foundry	24 00@ ....—4 mos
Tennessee, No. 2, "	23 00@ ....—4 mos
" " Mill	21 00@ ....—4 mos
Missouri, No. 1, Foundry	.... @ ....—4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 50@ ....—4 mos
" No. 2, "	21 50@22 00—4 mos
" Soft Silver Grey	21 00@ ....—4 mos
Ohio Mill	20 00@21 00—4 mos
Missouri, No. 1 Foundry	25 00@ ....—4 mos
" No. 2, "	24 00@ ....—4 mos
" Mill	22 00@22 50—4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00	—4 mos	
Tennessee "	25 00@32 00	—4 mos	
Missouri "	30 00@33 00	—4 mos	
Alabama "	25 00@32 00	—4 mos	

BLOOMS.

Charcoal	55 00@ 65 00	—cash

SCRAP IRON.

Cast	50c.@ 85	—cash
Wrought	1 00@1 40	—cash

Cleveland, Ohio. Jan. 23, 1877.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	26 00@....
No. 2, " " "	25 00@....
No. 1, Anthracite	24 00@....
No 2, "	23 00@....
No. 1, Bituminous	24 00@....
No. 2, "	22 00@....
American Scotch, No. 1, Cherry Valley	24 00@....
" " B—1, " "	23 00@....
" " No. 2, " "	22 00@....
No. 1, Massillon	24 50@....
B—1, "	23 00@....
No. 2, "	21 00@....

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	26 50@....
No. 4 " "	27 00@....
Nos. 5 and 6 "	27 00@....

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	26 50@....

FORGE IRON.

No. 1, Gray	21 00@....
White and Mottled	18 00@....

Louisville, Ky. Jan. 23, 1877.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market continues steady in price, with only a moderate demand, to supply immediate wants. Our quotations, as below, represent the extreme inside, as well as the outside of the market.

The usual time, four months, allowed on quotations below.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$24 00@25 00
No. 2 " " "	22 00@23 00
No. 1, Mill, from " "	20 00@21 00
No. 1. Foundry, from Alabama, Georgia and Tennessee ores	21 00@22 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	20 00@21 00
No. 1, Mill, from " " " "	20 00@ —

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	22 00@23 00
No. 2, " " " "	20 00@21 00
No. 1, Mill, " " " "	19 00@20 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	21 00@22 00
No. 2, " " " "	20 00@21 00
No. 1, Mill, " " " "	20 00@ —
No. 1 Foundry, from Missouri Ores	— @ —
No. 2 " " " "	— @ —
No. 1 Mill, from Missouri Ores	23 00@24 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@40 00
" " Tennessee "	26 00@28 00
" " Alabama and Georgia Ores	25 00@35 00
" " Kentucky Ores	25 00@40 00

Milwaukee, Wis. Jan. 23, 1877.

Specially reported by Messrs. R. P ELMORE & Co.

There is no change since writing you last in coal or pig iron, either in trade or price; still quite busy in coal but iron slow.

Lake Superior No. 1 Charcoal	$26 00
" " " 2 "	25 00
Lake Superior No. 1 Anthracite	25 00
" " " 2 "	24 00

Philadelphia, Pa.

(Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, Jr., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Jan. 25, 1877.)

PIG IRON.—The market remains in much the same condition as a week ago. Again we hear of large sales on private terms, but unfortunately but little of the iron is to go into immediate consumption, and only the low prices and favorable terms offered tempt buyers to anticipate their wants. The legitimate demand continues in a small way, but as orders are scarce, the foundries and mills in this neighborood report dull trade, and unremunerative prices for what orders they do get. We continue to quote the market weaker at $21 to $21.50 for No. 1; $19.50 to $20 for No. 2; $17.50 to $20 for gray forge as to quality.

MANUFACTURED IRON.—The demand has again dropped back into the old channel reported before the new year set in, and orders are few and far between. Even the skelp and tank orders have fallen off this week, this branch of the trade looking duller than has been reported for some time. We quote bars 2 to 2¼ cents per lb.; tank, 2¼ to 7 cents per lb., as to quality; skelp, 2¼ to 2½ cents per lb.; muck bars, $37 to $39.

NEW RAILS.—We have nothing new to report this week. Steel are selling as wanted at $50 to $52 at mill. Iron are quoted $36 to $40.

OLD RAILS are dull of sale with a weak feeling, as it is supposed many that are now impossible to move will come on the market in the opening of navigation. We quote $20 to $22.

SCRAP is in demand, as it is impossible to ship while the severe weather lasts. We report sales of 500 tons at $23; and quote $22 to $26 for wrought, $14 to $19 for cast.

Pittsburg, Pa. Jan. 23, 1877.

Specially reported by A. H. CHILDS.

No. 1 Foundry	23 00@24—4 mos
" 2 "	22 00@23 "
Gray Forge	20 00@22 "
White and Mottled	18 00@20 "
Warm blast Charcoal	23 00@28 "
Cold blast Charcoal Western	40 00@45 "

Richmond, Va. Jan. 23, 1877.

Specially reported by ASA SNYDER, Esq.

Sales of charcoal pig iron continue light. Inquiry has increased, with some tendency of a stiffening of prices. We quote:

Virginia Cold Blast Charcoal Pig Iron			$27 to $33
" Warm " " "			24 to 28
" " " Coke " "	1 X		23 to 24
" " " " "	2 X		21 to 22
" " " " "	3		20 to 21
" Anthracite	1 X		— to —
" "	2 X		— to —
" "	3		— to —

St. Louis, Mo. Jan. 23, 1877.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market remains dull and inactive, though a few of our foundries are running full. Demand unchanged; prices same. We quote:

CHARCOAL.

Missouri No. 1 Found'y.	$23@25
" " 2 "	22@23
" Gray Mill	22@23
H. Rock No. 1 Found'y.	25@26
" " " 2 "	23½@24
" " Gray Mill	23@24
Tenn. No. 1 Foundry	23½@24
" " 2 "	22½@23
" Gray Mill	22½@23

COKE.

Alice H. R. Ex No. 1 F'y.	26 00
" " 1 "	25 00
B, " 1 "	24 50
" " 2 "	23 50
Forge	23 50
Chat., Tenn. No. 1 Fd'y.	25 00
" " " 2 "	23 50
" " Forge	22 50
" " White Mtl'd	21 00

STONE COAL.

Missouri No. 1 Fd'ry.	25@24
" " 2 "	23@23
" Gray Mill	22@26
" White & Mt'd	21@22

COLD BLAST CHARCOAL FOR CAR WHEELS.

All Numbers.

Hanging Rock	35@46
Tennessee	30@33
Kentucky	30@33
Missouri	28@30
Georgia	28@30
Alabama	28@30
Assorted Bar Iron $2 25, rates.	
No. 1 Wrought Scrap 95c. cwt.	
Heavy cast " 70 "	
Light " 40 "	

Montreal, Canada. Jan. 16, 1877.

We quote: Pig Iron.—Eglinton and Clyde; $19.50@20.00; American $21.00@22.00; Summerlee and Calder $20.75@21.25; Langloan & Gartsherrie $22.00@22.50; Hematite $26.00@27.00. Bar, per 100 lbs., Scotch and Staffordshire $2.00@2.05; best do., $2.20@2.30, Swedes and Norway $4.75@$5.00; Lowmoor and Bowling, $6.@6.50.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Jan. 26, 1877.

The Presidential question showing signs of adjustment, a better feeling has sprung up in the metal trade. Holders are in some cases a little firm and there appears to be a better demand, although it is mostly in a jobbing way.

Gold Coin —During the week under review the price of gold has ranged from 106 to 106⅝, and closed at 106¼.

Bullion.—The price of silver in London is weak and only nominally quoted at 57¾@57⅞d., and is likely to recede still further, as the shipments to the East have diminished. The India council bills at the sale on Wednesday were awarded at a decline of ⅛d. per rupee, as compared with the previous week's award. The price has declined in this market $1.25 per oz for fine, while San Francisco continues to quote at 3 per cent. discount.

Copper.—The business in this article has been entirely in a small way There is an improving demand, holders are firmer with but little copper being offered. The market is firm at 19¼c.

The Houghton *Mining Gazette* of January 18th says: "Up to last evening (Wednesday) the Overland Transit Company has taken from the smelting works, for shipment east, eight hundred tons of ingot copper. Three hundred tons more have gone out of the country by other conveyances, making a total of 1,100 tons of ingots shipped within the last thirty days, the value of which is near $450,000." At this rate of overland shipments, they will become a very disturbing element in the winter business.

Tin is not so firm as a week ago either in this market or London. Straits in London is quoted at £74 10/@£75, while here we quote as follows in gold, per lb.: Straits, 17c.@17¼c.; L. & F., 16½c.; Refined, 17c @ 17¼c.; and Banca, 19c. About 2,000 slabs of straits are reported to have been sold at 16¾c. A fair jobbing demand is being done.

Tin Plates.—There is a fair jobbing business doing in these. Prices are nominally unchanged and as follows per box, in gold,: Charcoal tins, $6.62½@$6.87½, and ternes, $6.12½@6.37½; coke tins $6, and ternes, $5.50.

Lead.—We quote sales of 350 tons of "Richmond' lead at 6·2c., which is an advance over last week. Stocks at the seaboard are reported as small.

Spelter and Zinc.—Domestic spelter is quiet but firm at 6¼c. currency. Sheet zinc is dull at 8¼c. currency.

Antimony continues quiet at 13@13¼c., gold.

Quicksilver is quoted as follows: in London, £8; San Francisco, 50c. gold, and in this city 52c.]

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Jan. 26, 1877.

A decided decline has again occurred in the coal shares. This is influenced by the low rates received for coal, it being believed that they will scarcely do more than pay the bare expenses of getting it to market, to say nothing of the requirements for interest, charges, etc. It is rumored that one of the companies may soon pass into the hands of a receiver. A contemporary observes, with reference to the artificial element which sustains the list:

"The bears in the coal stocks are the chief prop and support, for having largely oversold the market the least artificial upward movement scares them out of their wits and they rush to cover while the prices rush up proportionately. This process has occurred again and again and usually gets its initiation from Exchange court, where 20,000 borrowed shares are believed to find a temporary resting-place."

The sales for the week show an increase of about 40,000, the total amounting to some 112,000 shares.

New Jersey Central Railroad.—About 44,000 shares of this stock have changed hands at from 36⅛ to 32⅝, closing at the lower figure.

Delaware, Lackawanna and Western Railroad Company.—63,000 shares of this stock have sold on the Board at from 76 to 71¾, closing at 72¼.

Mr. B. G. Clarke of the Thomas Iron Company was this day made a director of this company. Mr. Clarke has great experience in coal and iron matters, and comprehends the perilous situation the coal companies are now in, and will be a valuable acquisition to the Board of this company. He also fully appreciates the requirements of the iron trade and will undoubtedly give sound advice as regards the prices of coal and freights necessary for its safety.

Delaware and Hudson Canal Company's Stock has sold to the extent of 4,000 shares, and sold down to 65½, the closing price shows an advance of ¼ per cent. on the lower figure and a decline of 4¾ per cent. from our last.

Pennsylvania Anthracite Coal Company.—The Committee on Stock List of the New York Stock Exchange have reported in favor of placing on the free list of the Stock Exchange the stock of this company. This is a Pennsylvania corporation having 2,400 acres of land lying near Scranton and adjoining the lands of the Delaware, Lackawanna and Western Railroad Company and the Pennsylvania Coal Company. The capital stock of the company is $2,000,000; the bonded debt is $1,000,000.

Harleigh Coal Company.—This company has announced a dividend of 10 per cent., payable on demand.

The Maryland Coal Company will hold its annual meeting on the 6th of February.

The Cannelton Coal Company of West Virginia will hold its annual meeting on the 6th of February.

Cumberland Valley Railroad Company.—The receipts of this company during the year 1876, on its line from Martinsburg to Harrisburg, were $547,993 65; expenses, $249,892.46.

Mohave and Inyo Railroad.—A project is on foot to build a railroad from the Southern Pacific at Mohave, Cal., to the mining region of Inyo County, a distance of about 100 miles, in a northeasterly direction.

Quotations and Sales of Stocks and Bonds.

For the week ending Jan. 26, 1877.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	221	—
Consolidation Coal Co	—	—	34	—
Spring Mt. Coal Co	—	—	160	—
American Coal Co	—	—	*54	—
Maryland Coal Co	11¼	9½	9	1 0
Del., Lack., and West. RR. Co	76	72¼	72¼	62,904
New Jersey Central RR. Co	36⅛	32⅝	32⅝	43,853
Delaware and Hudson Canal Co	71½	67	65¾	4,195
Quicksilver Mining Co. pref'd	21¾	21¾	20½	100
" " " Common	—	—	14½	—
Mariposa Land & Min. Co. pref'd	6¾	5¾	5¾	700
St. Louis & Iron Mountain RR	12¼	11¾	11	117
Total Shares sold				111,969
Sales for the week previous				71,804
Increase				40,165

*Nominal. † Asked.

BONDS.

		Inter'st	Sales.	Price.
Del., Lack. & West. 2d M		M. & S.	....	.... @109
" " "	7's Con'ble	J. & D.	....	.... @106⅜
Cent'l RR. of N.J., 1st M, New		F. & A.	2,000	....@ 1·9
" " "	1st Cons	.....	10,000	.... @ 81
" " "	Convert'ie	M. & N.	11,000	77 @ 79
Lehigh & W.-B'e, Con. Guar'd.		.....	8,000	62 @ 62¾
Am. Dock & Imp. Mt. Bonds		J. & J.	....	.... @ 72½
Del. & Hud. Can., 1st M., 1891		.....	4,000	.... @102⅜
" " "	1894	...	7,000	.... @101
" " "	1877	.....	....	.... @101½
" " "	Coup. 7's, 1894	.....	5,000	.... @ 98
" " "	Reg'd 7's, 1894	.....	.....	@ ....
St. L. & Iron Mountain, 1st M		F. & A.	36,000	101⅛@101¾
" " "	2d M	M. & N.	....	.... @ 70
Chesapeake & Ohio 6's, 1st M		.....	.....	.... @ 26¾
" "	Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan con. 7s		.....	.....	.... @100½
Total sales			$ 83,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

MINING STOCKS.

AMERICAN MINING AND STOCK EXCHANGE.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	a No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	Closing Quotations g American Currency. Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	Shares sold during the Week.
Alpha Cons. G. S.	Nevada,	300	$ 3,000,000	30,000	$180,000	Aug. 12, '75, $1.	....	.....	$20 62½	20 00	$23 25	$23 25	$21 00	$21 37½	2,600
Belcher, G. S.	Nevada,	1,040	10,400,000	104,000	660,400	April 14, '71, $4.	$15,397,200	April 10, '76, $1.	11 00	60 00	11 50	12 00	10 12½	8 50	1,550
Bertha Gold Co.	Virgi'a.	645 acs.	300,000	30,000	**	.....	....	.....	8 12½	8 37½	8 50	8 50	8 75	8 50	6,150
Best and Belcher, G. S.	Nevada,	545	10,080 000	100,800	136,192	July 13, '74, 50c.	....	.....	35 87½	34 62½	41 25	39 00	36 50	35 12½	1,800
Bullion, G. S.	Nevada,	943½	10,000,000	100,000	2,052,000	Sept. 22, '76, $2.50.	....	.....	12 50	10 75	...	19 50	15 00	20 50	1,700
Caledonia, G. S.	Nevada,	2,188	10,000,000	100,000	1,210,000	Aug. 28, '76, $1.00.	....	.....	9 50	....	13 50	11 00	11 00	....	1,700
California, G. S.	Nevada,	600	54,000,000	540,000	....	.....	9,720,000	Jan. 15, '77, $2.	48 12½	48 75	55 75	53 50	49 37½	44 62½	1,600
Centennial, G.	Califor.	66 acres	1,000,000	100,000b	....	.....	....	.....	....	....	....	....	....	....	....
Chollar Potosi, G. S.	Nevada,	1,400	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	....	....	....	81 00	72 00	73 00	200
Cleveland, G.	Colo.	3,715	250,000	25,000b	**	.....	....	.....	9 50	9 75	9 62½	9 87½	9 75	9 87½	4,200
Cons. Hercules & Roe, S	Colo.	16,500	1,000,000	100,000	**	.....	120,000	.....	....	....	....	....	....	....	.....
Cons. Imperial, G. S.	Nevada,	468	50,000,000	500,000	125 000	July 25, '76, 25c.	....	.....	1 50	2 00	2 62½	2 75	2 75	2 12½	3,800
Con N. Slope & E.C.T.	Colo.	15,000	500,000	10,000	**	.....	....	.....	15 37½	15 87½	....	....	....	....	1,200
Cons. Virginia, G. S.	Nevada,	710	54,000,000	540 000	411,200	June 11, '73, $3.	25,920,000	Dec. 11, '76, $2.	....	51 75	55 87½	57 00	51 25	45 62½	1,300
Confidence, G. S.	Nevada,	130	2,496,000	24,960	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.33½	....	8 25	....	12 50	....	....	150
Crown Point, G. S.	Nevada,	600	10,020,000	100,000	1,274,370	Jan. 10, '77, $1.	11,588,000	Jan. 12, '75, $2.	6 62½	....	8 75	8 50	8 00	....	1,100
Douglas Mining Co.	Colo.	21,000	1,000,000	10,000	**	.....	....	.....	29 00	28 25	....	....	....	....	175
Eureka Cons. G. S. L.	Nevada,	..	5,000,000	50,800	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75, $1.	....	22 50	....	22 50	....	23 37½	750
Exchequer, G. S.	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	....	....	....	8 00	....	....	200
Gould and Curry, G. S.	Nevada,	621	10,800,000	108,000	2,018,000	Dec. 11, '76, $1.	3,934,800	Oct. 10, '70, $10.	13 25	14 00	14 87½	15 00	12 50	11 75	1,650
Grant, G. S.	Nevada,	1,030	10,000,000	100,000	....	.....	....	.....	5 12½	5 00	5 37½	5 50	5 50	5 62½	4,850
Granville Gold Co.	N. Car.	9,000	1,000,000	100,000	**	.....	....	.....	5 25	5 00	5 62½	5 50	6 00	5 50	6,200
Hale & Norcross, G. S.	Nevada,	400	11 200,000	112,000	2,24 ,000	Oct. 10, '76, $1.	1,598,000	April 10, '71, $5.	....	....	8 50	7 00	7 00	5 37½	2,700
Hukill, S.	Colo.	3,285	1,000,000	10,000	**	.. ...	20,000	Nov. 1, '76, $1	....	....	....	....	....	....	.....
Indian Queen, S.	Nevada,	1,000	3 000,000	60,000	....	.....	60,000	.....	....	....	....	....	....	....	.....
Julia Cons. G. S.	Nevada,	3,000	11,000,000	110,000	220,000	Jan. 4, '77, $1.	....	.....	4 50	5 50	6 87½	5 50	5 00	5 12½	1,650
Justice, G. S.	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	12 00	12 50	....	14 50	14 75	14 62½	1,900
Kentuck, G. S.	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,000	March 8, '70, $5.	....	....	....	8 25	8 12½	8 25	1,400
Kossuth, G. S.	Nevada,	2,700	5,400,000	108,000c	493,000	Aug. 15, '76, 50c.	....	.....	....	....	....	....	1 50	1 25	3,800
Leopard, G. S.	Nevada,	1,500	5,00 ,000	50,000	50,000	March 31, '76, $1.	162,500	Dec. 15, '76, 50c.	....	4 37½	....	....	4 50	4 37½	950
Lucerne Mining Co.	Colo.	4,200	5,000,000	500,000	**	.....	....	.....	....	1 87½	1 87½	1 87½	1 87½	1 75	4,900
Mer. and Min. Tun. Co.	Colo.	32,000	500,000	50,000	**	.....	....	.....	....	....	....	....	....	....	.....
Merrimac, S.	Mass.	1,500	500,000	50,000b	**	.....	15,000	Dec. 10, '76, $1.	5 37½	5 37½	5 87½	5 62½	5 62½	5 50	10,100
Mexican, G. S.	Nevada,	600	10,080,000	100,800	100,800	Sept. 5, '76, 50c.	....	.....	18 62½	....	....	20 87½	20 50	19 00	2,500
Morning Star	Nevada,	1,600	8,000,000	80,000	....	.....	....	.....	....	....	....	....	....	....	.....
Northern Belle, S.	Nevada,	1,600	5,000,000	50,000	....	.....	1,000,000	Jan. 15, '77, $1.	....	25 37½	26 50	27 50	28 00	28 25	8 0
Ophir, G. S.	Nevada,	675	10,080,000	100,800	2,034,400	May 14, '75, $2.	1,391,400	March 9, '04, $4.	22 37½	22 50	29 00	27 50	26 00	25 37½	2,000
Original Comstock, G. S.	Nevada,	....	10,000,000	10,000	....	.....	....	.....	....	....	....	....	....	....	.....
Overman, G. S.	Nevada,	1,200	3,840,000	38,400b	2,222,280	Oct. 21, '76, $3.	....	.....	....	92 00	111 00	110 25	103 75	97 00	640
Pleasant View	Colo.	1,200	200,000	20,000'	**	.....	....	.....	....	....	....	....	....	....	.....
Raymond and Ely, G. S.	Nevada,	5,000	3,000,000	30,000	510,000	Dec. 5, '76, $1.	3,075,000	Sept. 10, '73, $3.	....	5 50	....	....	6 50	8 00	650
St. Joseph Lead Co.	Misson.	26.0 acs.	1,000,000	100,000	....	.....	210,000	.....	....	6 25	....	6 62½	....	5 50	400
Santiago, G. S.	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....	....	....	.....
Savage, G. S.	Nevada,	800	11,200,000	112,000	2,858,000	Nov. 25, '76, $1.	4,460,000	June 11, '69, $3.	8 75	9 62½	10 50	10 50	10 25	9 62½	2,650
Seg. Belcher, G. S.	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	....	....	....	....	....	72 00	.....
Sierra Nevada, G. S.	Nevada,	3,650	10,000,000	100,000	1,500,000	Oct. 24, '76, $1.	102,500	Jan. 16, '71, $1.	8 62½	....	....	10 25	....	9 25	1,200
Silver City, G. S.	Nevada,	3,900	6,310,000	63,100	15,775	Nov. 16, '76, 25c.	....	.....	....	....	....	....	....	....	..
Silver Hill, G. S.	Nevada,	5430	10,800,000	108,000	810,000	Sept. 18, '76, $1.	....	.....	....	....	8 50	....	....	6 50	500
South Comstock, G. S.	Nevada,	1,500	10,000,000	100,000	44,000	May 3, '76, 10c.	....	.....	....	....	....	....	....	....	.....
South. California, G. S	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....	....	....	.....
Southern Star, G. S.	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	....	....	....	....	....	....	.....
Trenton, G. S.	Nevada,	..	10,000,000	100,000	....	.....	....	.....	....	....	....	8 87½	....	....	300
Union Cons. G. S.	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	9 50	10 00	11 87½	9 50	9 50	10 25	2,700
West Belcher, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Yellow Jacket, G. S.	Nevada,	1,200	12,000,000	120,000	2,718,000	Oct. 28, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	14 00	13 25	18 50	17 12½	15 00	12 87½	3,400
Young America, S.	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20c.	....	.....	....	....	....	....	....	....	.. ..
			Assessments levied to date, $28,015,537		Div'ds pd. to date, $86,371,400								Total sales		88,015

BOSTON STOCK MARKET.

									Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	
A'louez, C.	Mich.	..	$1,000,000	20 000	$940,000	May 9, '76. $5.	....	.....	$5 50	5 62½	5 50	5 25	5 00	5 25	.....
Calumet and Hecla, C.	Mich.	¼ mile	2,000,000	80,000d i	1,200,000	.....	$11,050,000	Nov. 15, '76, $5.	178 75	173 50*	173 62½	173 25	173 00	173 00	.....
Central, C.	Mich.	..	500,000	20,000c	100,000	June, '62, 65c.	1,020,000	Feb. 17, '76, $5.	36 00	36 12½	36 00	36 12½	36 00	36 00	.....
Copper Falls, C.	Mich.	..	1,000,000	20,000d	535,000	May 10, '76.	100,000	Nov., '71, $1.	3 25	3 18½	3 12½	3 12½	3 00	3 12½	.....
Dana, C	Mich.	..	500,000	20,000d	68,000	Jan., '73, 50c.	....	.....	12½	12½	12½	12½	12½	12½	.....
Dawson, S.	Canada.	..	1,200,000	60,000f	....	.....	.. ..	.....	15	15	14	13	12½	12½	.....
Duncan, S.	Canada.	..	1,200,000	60,000f	75,000	July, '76, 41⅔.	....	.....	6 75	6 37½	6 62½	6 50	6 25	6 00	.....
Franklin, C	Mich.	..	500,000	20,000d	362,000	June, '68, $5.	585,000	Nov., '71, $1.	14 25	14 12½	14 25	14 12½	14 25	14 25	.....
Humboldt, C.	Mich.	..	500,000	20,000d	100,000	Sept. 28, '76, 15c.	....	.....	18	18	17½	18	17½	18	.....
International, S.	Canada.	..	1,200,000	60,000f	....	.....	....	.....	75	75	75	68¾	62½	62½	.....
Madison, C.	Mich.	..	50 ,000	20,000d	123,000	Sept. 11, '74, 10c.	....	.....	37	40	40	37	40	40	.....
Mesnard, C.	Mich.	..	500,000	20,000d	160,000	April 12, '65, 50c.	....	.....	50	50	50	50	50	50	.....
Minesota, C.	Mich.	..	1,000,000	20,000c	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50c.	1 75	1 62½	1 62½	1 50	1 50	1 25	.....
National, C.	Mich.	..	500,000	20,000d	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	1 37½	1 37½	1 31¼	1 37½	1 37½	1 37½	.....
Osceola, C	Mich.	..	1,000,000	40,000d	880.000	May 1, '76, $2.	....	.....	35 12½	20 25	20 50	21 00	24 00	24 00	.....
Petherick, C.	Mich.	..	500,000	20,000d	165,533	March 22, '76, 50c.	....	.....	40	40	40	40	40	40	.....
Pewabic, C	Mich.	..	500,000	20,000d	185,000	June, '68, $3.	460,000	July, '73, $1.	3 25	3 37½	3 25	3 37½	3 37½	3 37½	.....
Phœnix, C.	Mich.	..	1,000,000	20,000d	817,500	Sept., '70, $3.	20,000	Jan 20, '76, $1.	....	....	....	....	....	....	.....
Quincy, C.	Mich.	..	A 200,000	20,000b	....	.....	2,050,000	Oct. 28, '76, $3.	48 50	48 62½	48 75	48 87½	48 75	48 75	.....
Ridge, C.	Mich.	..	500,000	20,000d	200,000	... ..	90,000	Feb. 8, '75, $1.	4 50	4 62½	4 50	4 62½	4 50	4 50	.....
Rockland, C	Mich.	..	500,000	20,000d	495,000	Jan., '74, $1.	....	.....	37	37	36	37	37	37	.....
Star, C.	Mich.	..	500,000	20,000d	265,000	March 30, '76, 50c	....	.....	35	36	37	37	37	37	.....
Superior, C.	Mich.	..	500,000	20,000d	340,000	March, '74, 25c.	....	.....	12½	12½	12½	12½	12½	12¼	.....
			Assessments levied to date, $7,640,033		Div'ds paid to date, $17,535,000								Total sales ..... —— shares		

G. Gold. S. Silver. L. Lead. C. Copper. a The par value of shares is $100, unless otherwise designated. b Par value $10. c Par value $50. d Par value $25 each. e Par value $15. f Par value $20. g Closing quotations represent the latest prices bid. Prices asked will have a * affixed. h Full paid. i On the four old companies. * Ex-di vidend, $5 per share.

Gold and Silver Stocks.

AMERICAN MINING AND STOCK EXCHANGE.

NEW YORK, FRIDAY EVENING, Jan. 26, 1877.

The quotations of mining shares show quite an improvement as compared with the prices in our last. California has a ivanced to $55¾ and Consolidated Virgi ia to $57 per share. The closing prices are below these figures, a generally better feeling, however, is noticeable. The combined product of these two companies for the year just closed amounted to $30,047,018, from which $20,520,000 in dividends were paid to the stockholders; this amounts to about $20 per share, or equal to an income of 40 per cent. on the present market value of the stock of these companies.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, Jan. 25, 1877.

The transactions in coal shares during the past week show an increase of some 26,000 shares, the total amounting to about 116,000. The market has been very irregular during the week and prices generally closed lower.

Pennsylvania Railroad.—About 28,000 shares of this stock have changed hands betwe n the range of 48⅛@ 48⅝ closing at 48¼. The dividend period of this company will occur during next month.

Reading Railroad.—The decline in the stock of this company to 14⅞, equal to 29¾ per cent., has been the feature of the week; the transactions aggregate nearly 75,000 shares. The closing price shows a recovery from the lowest figure. The New Convertible 7 per cent' bonds have also suffered a serious decline, having touched 40 per cent., against 74 per cent. on the 1st of January, and 62 per cent. as quoted last week. The *Ledger* of to-day says, with regard to the decline of these bonds, "that they are cut out by what is called the $10,000,000 'blanket mortgage' last issued by the company, and now being used at about 40 per cent of their face as collateral for taking up the company's floating debt. with no present intention of their ever coming on the market as part of the funded debt. If these 'blanket mortgage' bonds shall prove of sufficient credit to hold the floating debt until the company can earn enough to pay such debt they will not come upon the market, and the new convertible 7s. will hold their former relative position in the funded debt."

The *Post* of to day says: "The *Commercial Advertiser* yesterday alluded to the heavy lo ses of Messrs. McCalmont Brothers & Co., of Lond n, by reason of the depreciation of this Company's securities. The writer correctly said that after deducting all these losses the firm is worth over £2 000,000 or $10,000,000; he might have added that it is worth this sum with its name committed to no uncovered obligations The acceptances of the firm remain undoubted in the London discount market. It is well understood there as well as among the leading bankers here, that the connection of the McCalmonts with Reading has been so profitable for the past thirty-five years that the depreciation of the securities of that company causes no loss on their whole Reading account; and that this would be true even if, as is not unlikely, Reading stock is extinguished. In other words, the McCalmonts can mark their Reading securities off their books, charge interest on the money which they cost, and still their Reading account for the whole thirty five years would show a considerable profit. It is also well, if not generally understood that the McCalmonts have decided not to advance another pound to the Reading Company. This explanation is due to those who use the credit of the house; and there are few New York merchants who are not familiar with their bills, which are regarded among the best made in the market."

Lehigh Valley Railroad Company.—The stock of this company is very firm, and but sparingly dealt in. The final price shows a slight advance.

Lehigh Coal and Navigation Company.—About 12,000 shares of this stock have changed hands at from 30¾ to 28¼, closing at 28⅞, which is a slight decline as compared with our last. The dividend period of this company will occur during the coming month.

Bonds have sold to the extent of about $100,000 at generally lessened prices.

Auction Sales of Stocks and Bonds during the week have been as follows:

Mill Creek and Mine Hill Navigation Company.—27 shares par 25 at $26 per share.

Mount Carbon and Port Carbon Railroad Company.—6 shares par 50, at 58¼ per share.

Pennsylvania Salt Manufacturing Company.—15 shares at 66¼ to 166 per share.

Westmoreland Coal Company.—40 shares at 180 per share.

American Kaolin Company.—$500 7 per cent. bonds at 20 per cent.

The Buck Mountain Coal Company will hold its annual meeting on the 7th of February.

The Huntington and Broad Top Railroad and Coal Company will hold its annual meeting on the 6th of February.

Chestnut Glen Oil Company.—A dividend of ¾ per cent. has been declared by this company, payable on demand.

The Alliance Coal Mining Company will hold a special meeting on the 13th day of March, to consider and adopt or reject resolutions of the Board of Directors to increase the indebtedness of the Company to $500.000, issue bonds therefor, and secure the same by mortgage The regular annual meeting of the stockholders will also be held on the same date.

The St. Nicholas Coal Company will hold its annual meeting on the 5th of February.

Emaus Iron Company.—We note a recent auction sale of $7,000 of the bonds of this company at 50 per cent.

Quotations and Sales of Stocks and Bonds,

For the week ending Jan. 25, 1877.

STOCKS.

	Highest	Lowest	Closing	Shares
Lehigh Valley RR. Co	49⅜	49	49	683
Pennsylvania RR.	48⅝	48⅛	48¼	28,352
Reading RR.	18⅝	14⅞	15⅛	74,856
Lehigh Coal and Nav. Co	30½	28¼	28¾	11,540
Penn. Canal	—	—	—	—
Buck Mountain Coal Co.	—	—	*25	—
Fulton Coal Co.	—	—	—	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co.	—	—	—	—
Cambria Iron Co.	—	—	15	200
Crane Iron Co.	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	62	—

Total shares sold 115,631
Sales for the week previous 89,609
Increase 26,022

* These quotations are nominal.

BONDS.

	Sales.	Price
R. and B. T. RR. 1st mortgage, 7s	$ —	— @108
" " " 2d " "	—	— @105
" " " 3d " cons	—	— @ 30
Lehigh Valley RR. Con. mtg. 6s	9,000	— @ 98½
" " " 7s, 1910	5,000	— @115
" " " 6s Reg	—	— @108¾
" " " 6s coup	—	— @119¼
Pennsylvania RR., 1st mtge. 6s	17,000	105¼ @105½
" " gen. " cou. 1910	—	— @106
" " gen. " 6s, reg	2,000	— @109
" " Cons. M. 6s reg	2,000	— @100
Phil. & Reading RR. Con. M. 7s Reg	1,000	— @ 95
" " " 6s, 49-80	—	— @103
" " " 7s 1893	1,000	— @108
" " new convertible 7s	22,000	49 @ 61
" " 6s 1880	—	— @103½
" " Cons M.7s coup	42,000	91½ @ 92¼
" " debenture 6s	—	— @ 60
" " 6s gold coupon	—	— @ 95
Phil. & Reading C. & I. Co. Deb. 7s	—	— @ 55
" " Helfenstein tract	—	— @ 65
Lehigh Coal & Nav. Co., 6s '84	500	— @105
" " " RR. 6s, '97	—	— @104½
" " " con. 7s	—	— @ 80
" " " 6s gold loan	5,500	— @ 99
" " " Conv. gold loan	1,000	— @108
Penn. Canal, 6s	2,000	— @ 70
Penn. and N. Y. Canal, 7s	—	— @113
Ches. and Del. Canal, 6s	—	— @ 85
Susquehanna Canal, 6s	—	— @ 68
Delaware Division Canal, 6s	—	— @—
Susquehanna Coal Co. 6s	—	— @ 78
Buck. Mount Coal Co. 6s	—	— @—
Penn. Gas Coal Co. 6s	—	— @—
Honeybrook Coal Co. 7s.	—	— @—

Total amount of sales $110,000

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Jan. 25, 1877.

The market on mining stocks remains in about the same condition as previously reported. There is not much outside demand, neither is there much stock pressing for sale. Calumet closes 75c. off from the highest point, notwithstanding the dividend of $5 per share. Copper Falls has been forced down to 3 this week to take in some stock that was being carried for a concern that lately failed. This out of the way the stock is strong again at 3⅛ bid, 3⅜ asked. Duncan has been quiet, and closed ¾ off from the highest point of the week. National is firmer and in demand at 1¾. Osceola has taken a decided jump from 20 to 25, a sale at the latter price having been made just as I am writing. Quincy firm and quiet. In the small copper nothing.

Calumet & Hecla Mining Company.—This company has declared a dividend of $5 per share payable, Feb. 15th.

The Quincy Copper Mining Company has declared a dividend of $4 per share, payable February 15th.

Gas Stocks.

NEW YORK, FRIDAY EVENING, Jan. 26, 1877.

Gas stocks continue very dull, and with but little change worthy of note.

Northern Liberties Gas Company.—13 shares of this stock were sold at auction in Philadelphia during the week, at $48 per share.

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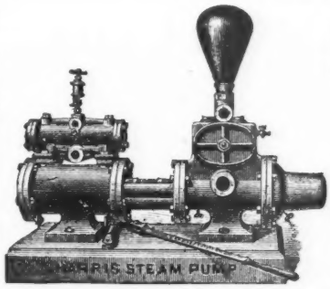

Reading Hydraulic Works,

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Manhattan Gas Company.—25 shares of this stock were sold at auction during the week at $225 per share.

Boston Gas Company.—We are reported small transactions in this stock during the week at from $807½ to $812½ per share.

The Philadelphia Gas Trust.—The forty-second annual report of the trustees of the Philadelphia Gas Works was presented to the City Councils on the 25th inst. Since the last report there have been expended for works $331,456.58; for mains, $135,772.14; for services, $129,810 43—making a total of $597,019.25. Deducting from this the amount received on account of mains and services $70,065.47, a balance of $526,953.78 is given. The quantity of gas manufactured during 1876 was 2,154,281,000 cubic feet, an increase of 281,089,000 cubic feet, or about fifteen per cent. over 1875. The street mains laid during the past year were 112,993 feet, making the entire length of the mains laid through the city and in use by the gas works 674½ miles. The amount of street mains laid last year was not so large as that laid in 1875, as almost all the street mains laid for the Exhibition grounds and buildings were laid in the former year, amounting to forty-one miles. The whole number of lamps on January 1 was 11,350, of which 10,875 were supplied with gas from these works, and 475 with gas from the Northern Liberties Works. The loans created by Councils from time to time for the construction of works, their increase and manufacturing capacity, the extention of mains and for the purchase of other works, amounted to $7,070,000. The total amount advanced on the credit of the city to the construction of the gas works since their creation has been $7,820,740. The loans now due and outstanding foot up $5,700,000. Deducting cash securities ready to pay this, amounting to $2,752,907.68, there is simply a balance of $2,947,092.32 to be provided for. The total amount vested in the gas works is $9,767,928.24. The net profits of the works during the past year were $365,015.51, making the total amount of accumulated profits up to the end of 1876 of $3,062,943.75. The maximum consumption in twenty-four hours was 8,794,000 cubic feet, which occurred on the night of the 18th of December. The maximum production of gas in twenty-four hours was 8,176,000 cubic feet.

Northern Liberties Gas Company.—The following is an abstract of the statement this company submitted to the Councils on the 25th inst.: Receipts for sale of gas, $172,249 66; for sale of coke, tar, etc., $9,659.49. Total, $181 909.15. The only feature possessing any degree of novelty in the operation of these works last year, was a reduction in the price of gas. This was effected early in the year. Since then gas has been supplied to private consumers at $2.15, and to all public burners of gas at $1.07½ per thousand cubic feet. During the year there were put down 228 feet of three inch main.

Washington Gas Company.—The dividend period of this company occurs during the present month.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Dividend.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Jan. '77	98	100
" " Bonds	90,000	1,000	†3½	Aug. '76		109
NewYork, "	4,000,000		5	Nov. '76	130	132½
Metropol. "	2,500,000	100	5	Sep. '76	145	150
" " Certf.	1,000,000	....	3½	" "	102½	104½
" " Bonds	500,000	1,000	3½	Dec. "		102
Harlem "	1.850,000	50	4	Aug. '76	106	—
Manhattan "	4,000,000	50	10	Dec. "	233	236
Brooklyn, B'klyn.	2,000,000	25	5	Nov. '76	175	177½
Nassau "	1,000,000	25	4	Jan. '76	80	—
" " Certf.	700,000	1,000	3½	Nov. '76	95	—
People's "	1,000,000	10	3½	Jan. '76	50	55
" " Certf.	300,000	1,000	3½	July '76	84	90
" " Bds	325,000	....	3½	Aug. "	90	96
Metropol. "	1,000,000	10	3½	Nov. '76	76	80
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" " Certf.	1,000,000	....	3½	July "	100	102½
Citizen's "	1,200,000	20	2½	Jan. '76	95	101
" " Certf.	320,000	1,000	3½	Oct. "	98	102
J. C. N. J.	750,000	20	5	July, '75	160	—
Centl. Westch. N.Y.	465,000	50	4	July, "	90	—
Subur'n " "	390,000	50				90

† Gold.

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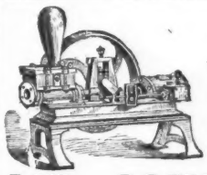

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